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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Ronald P. Schmidt

Serial No.: 09/898,633

Filed: 07/02/2001

For: **ADHESIVE-INFUSED 3-D WOVEN
TEXTILE PREFORMS FOR
STRUCTURAL JOINTS**

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Attorney Docket No.: TA-00519

Examiner: **Sing P. Chan**

Group Art Unit: 1734

DECLARATION UNDER 37 CFR 1.132

Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

I, James E. Bradley, state the following:

1. I am the attorney for the applicant of above-identified patent application (09/898,633) and U.S. Patent No. 6,374,570 issued to McKague, Jr. (hereinafter "McKague").

2. McKague and this application were, at the time the invention of this application was made, owned by the same entity and are currently owned by the same entity, Lockheed Martin Corporation, 6801 Rockledge Drive, Bethesda, Maryland 20817.

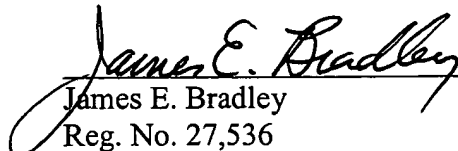
3. The facts set forth in this declaration, the original application, and as so amended herewith by this response are true, and all statements made on information and belief are believed to be true. That these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application and any trademark registration issuing thereon.

FURTHER DECLARANT SAYETH NOT.

Date:

July 7, 2004

BRACEWELL & PATTERSON, L.L.P
P.O. Box 61389
Houston, Texas 77208-1389
Telephone: (713) 221-3301
Facsimile (713) 222-3287


James E. Bradley
Reg. No. 27,536

CERTIFICATE OF MAILING
37 CFR 1.8(a)

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date of Deposit:

Dec 29, 2003

By

James E. Hudley

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF
Ronald P. Schmidt

DOCKET NO. TA-00519

SERIAL NO.: 09/898,633

EXAMINER: Sing P. Chan

FILED: 07/02/2001

GROUP ART UNIT: 1734

**TITLE: Adhesive-Infused 3-D Woven Textile
Preforms for Structural Joints**

DECLARATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Stephen D. Owens, state the following:

I am employed by Lockheed Martin Corporation as an engineer. My title is Engineering Senior Staff, Joint Strike Fighter Airframe Certification. I have been employed with Lockheed Martin and its predecessor, General Dynamics, for nineteen years.

Lockheed Martin Corporation is the assignee of the above-identified patent application.

I am a co-author of a technical paper *Interlaminar Reinforced Composites Development for Improved Damage Tolerance* (copy of first page attached). That technical paper was presented at a Closed Session of the Society for Advancement of Material and Process Engineering (SAMPE) in 2000. I did not attend that particular session, but have attended other

Closed Sessions and am familiar with how these sessions are held. Closed Sessions are meetings generally attended by representatives from the United States government and various military contractors. The purpose of the meetings is to communicate general information about various research projects underway at the different facilities. In my experience, often the U.S. government will request various contractors to present papers at these meetings.

Entrance to a Closed Session is restricted. I do not have any written materials concerning entry to the particular Closed Session where the subject technical paper was given. However, I am attaching to this declaration a portion of document advertising a recent SAMPE meeting. As shown on the second page, in order to be admitted to a Closed Session, one needs to have certification credentials based on a DD Form 2345 that has been approved by the government, or one must be employed by a company that is in the DoD's quarterly qualified U.S. contractor access list. I am attaching also to this declaration a sample of a DD Form 2345 for a particular individual. In my experience, about forty to fifty people attend a Closed Session of this nature. My understanding is that approximately the same number attended the Closed Session during which the subject technical paper was presented. The restrictive entry rules as explained above applied to the Closed Session during which the subject technical paper was presented.

I do not believe that any copies of the subject technical paper were given to the attendees at that particular Closed Session. My employer had a copy because I was a co-author. The copy has a warning printed on the first page, which states::

This paper contains research findings and technology developments in airframe composites technology that may constitute a significant enhancement to the national defense, and to the economic vitality of the United States; therefore access by foreign firms, institutions or persons must be controlled. The provisions of the International Traffic in Arms Regulation (22 CFR pt. 121 et seq.), the DOD Industrial Security Regulation (DOD 5220.22-R) and the Department of Commerce Export Regulation (15 CFR pt. 770 et. Seq.) may be applicable to this submittal.

Consequently, not only was the attendance to the Closed Session restricted, the dissemination of the subject technical paper was also restricted.

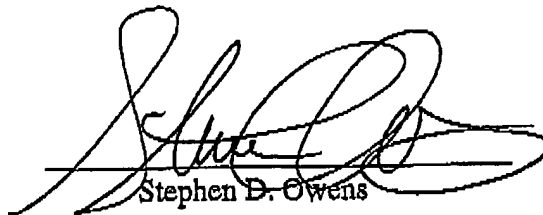
While the attendees at the Closed Session would have been interested in the subject matter of the subject technical paper, many others that were not present would also be interested. The information in the subject technical paper presented at the Closed Session is valuable not only to those attending, but to numerous others that did not or could not attend. There are thousands in the defense industry that might have an interest but would not be aware of such a meeting or be unable to attend. The subject matter of the paper deals with composite fiber technology for providing strong and lightweight structural members. This technology has applications in many industries other than the defense industry, such as general aviation, automobiles, and boats. Consequently, there are countless numbers of individuals that may have interest in this type of information but are prohibited from attending because they lack the DOD requirement certification and do not work for qualified defense contractors.

The subject technical paper was not and is still not publicly available. It is not listed on any databases to my knowledge that are accessible to the general public. Also, to my knowledge, SAMPE will not provide copies of the subject technical paper to the general public.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are

punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dec 02, 2003
Date


Stephen D. Owens

INTERLAMINAR REINFORCED COMPOSITES DEVELOPMENT FOR IMPROVED DAMAGE TOLERANCE

Steven Wanthal, Robin Wippich-Dienhart, Anne Cenedella
The Boeing Company, St. Louis, MO

Gerald Mabson, Lyle Deobald
The Boeing Company, Seattle, WA

Steve Owens
Lockheed Martin, Ft. Worth, TX

Victor Li, Dave Kane
Northrop Grumman, El Segundo, CA

ABSTRACT

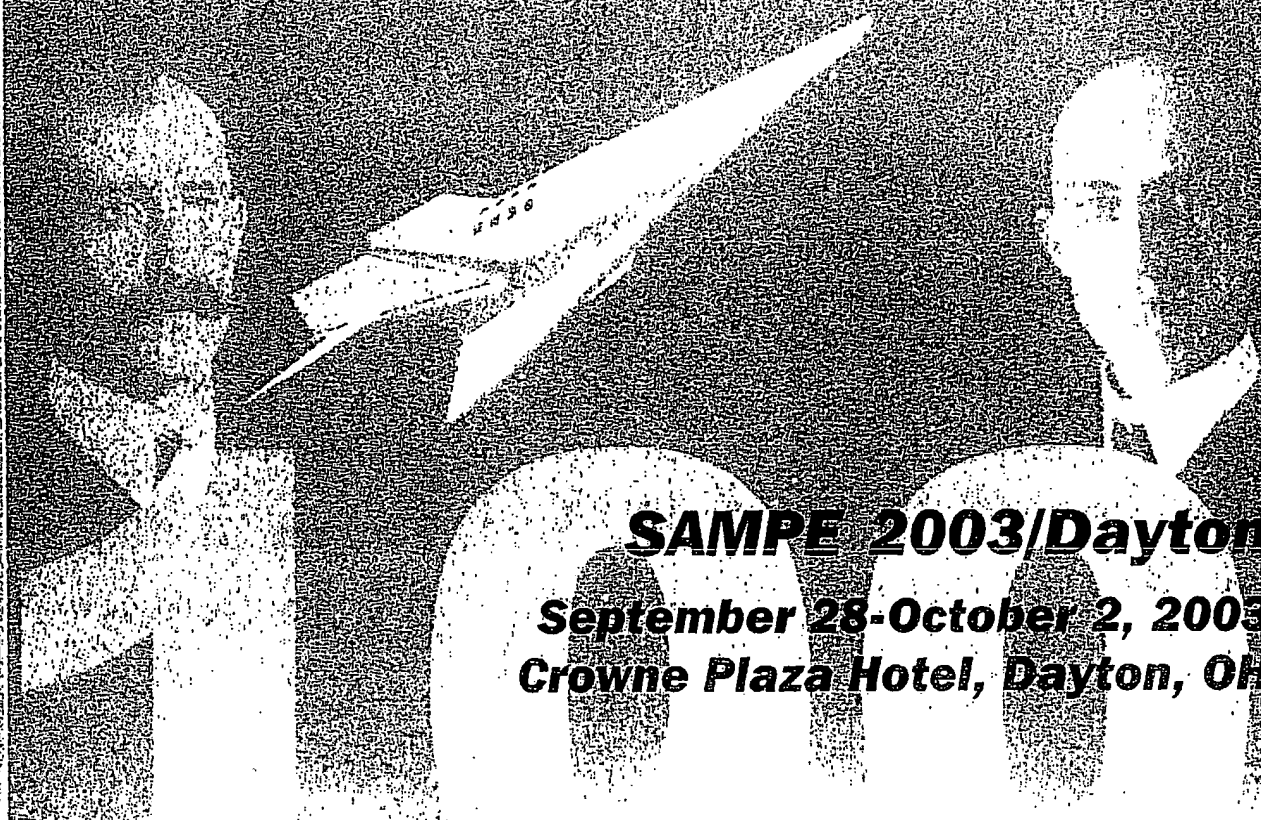
Studies have shown that more affordable composite structure can be achieved through the application of bonded/cocured designs. However, bonded/cocured joints without Z-direction reinforcement have demonstrated poor damage tolerance thereby limiting application of unitized designs on airframe structure. This paper summarizes several efforts within the Composite Affordability Initiative (CAI) - Pervasive program to evaluate and implement application of 3D textile preforms, stitching, and Z-fiber™ insertion technologies as a means to improve damage tolerance of composite structure. A review of the various Z-direction interlaminar reinforcement concepts and their limits of application will be presented. Specific applications of these technologies on CAI-developed structures will be reviewed. This paper also summarizes both the analytical and experimental work conducted to date on stitched and Z-fiber™ pinned skin-to-spar joints. Finally, this paper will address the current state-of-the-art in interlaminar reinforcements and suggest areas where further work is needed to prepare these processes for production.

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This paper contains research findings and technology developments in airframe composites technology that may constitute a significant enhancement to the national defense, and to the economic vitality of the United States; therefore access by foreign firms, institutions or persons must be controlled. The provisions of the International Traffic in Arms Regulation (22 CFR pt. 121 et seq.), the DOD Industrial Security Regulation (DOD 5220.22-R) and the Department of Commerce Export Regulation (15 CFR pt. 770 et. seq.) may be applicable to this submittal.

Technical Program and Exhibitor's Guide

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SAMPE 2003/Dayton

**September 28-October 2, 2003
Crowne Plaza Hotel, Dayton, OH**

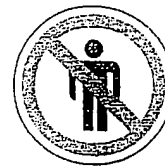
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NO ADMITTANCE

SAMPE Closed Papers Admittance



NO ADMITTANCE

Admittance to closed papers is implemented by DoD Directive 5230.25 under the provisions of Section 1217 of Public Law 98-94. Employees of the US and Canadian governments need only provide personal photographic identification and proof of employment by the government. Admission requires US and Canadian citizens and resident aliens to provide:

1. Proof of citizenship or resident alien card, *PLUS*
2. Personal photographic identification (i.e., driver's license, passport, corporate ID, etc.) *PLUS*
3. Certification credentials based on DD Form 2345.

An Individual's certification credentials may be:

1. Copy of an approved DD Form 2345 for the individual, or
2. Copy of an approved DD Form 2345 for the individual's employer plus evidence of employment status with that employer (i.e., corporate ID, business card, etc.), or
3. A listing of the individual's employer in DoD's quarterly Qualified US Contractor Access List plus evidence of employment status with the listed employer.

Requests for DD Form 2345 may be directed to SAMPE International Business Office, PO Box 2459, Covina, CA 91722-8459 or phone 626/331-0616 ext. 610. Questions about how to complete the DD Form 2345 should be directed to the Defense Logistics Services Center (800/352-3572).

Persons who are not citizens or resident aliens of US or Canada and wish to attend closed papers must submit a request to the Foreign Liaison Office in the US Defense Intelligence Agency through their embassy in Washington, DC. The US Department of Defense may authorize the attendance of foreign nationals when their attendance advances intergovernmental programs.

**ANYONE NOT COMPLYING WITH THE PRECEDING ATTENDANCE
REQUIREMENTS WILL NOT BE ADMITTED TO CLOSED PAPERS
—NO EXCEPTIONS—**

Tours*



Thursday, October 2, 1:00 p.m. - 4:30 p.m. Two tours have been arranged by the conference committee: Carillon Park and Huffman Prairie Flying Field and Interpretive Center

Tours will be simultaneous, so select only one.

Transportation (van) will be provided for a minimal charge of \$7. You will be responsible for any required admittance fees.

You must sign up for the tours by Wednesday noon, October 1. A minimum of 6 attendees for each tour is required, otherwise the tour will be cancelled.

Meet in the hotel lobby, and the vans will leave at 1:00 p.m., returning by 4:30 p.m.

**See outside back cover for an additional tour*

HISTORIC CARILLON PARK

Tour Historic Carillon Park—A Walk Back in Time

One of the many "extracurricular" activities during the Conference will be a tour of Carillon Historic Park. Located on 65 acres of beautifully landscaped grounds on the southwest side of Dayton. This outdoor museum features Ohio's largest carillon, the 57-bell Deeds Carillon; the 1905 Wright Flyer III, the world's first practical airplane and a National Historic Landmark; a large collection of antique bicycles, automobiles and rail equipment; and 23 exhibit buildings and structures that help interpret the Dayton area's rich heritage, especially in transportation technology. The Park has been described as "a walk back in time" by many Daytonians.

There will be an entrance fee of \$5 for adults, \$4 for seniors 60 and older, \$3 for students 3-17, and free for children under 3.

HUFFMAN PRAIRIE FLYING FIELD AND INTERPRETIVE CENTER

Part of Dayton Aviation Heritage National Historic Park, the visitors center uses state-of-the-art interactive exhibits to tell the story of how the Wright Brothers went beyond proving that flight was possible to making flight practical at Huffman Prairie Flying Field. The center also tells the story of how this 80-acre field grew into Wright Patterson Air Force Base and how what the Wright Brothers started continues today at Wright Patterson. Visit the Huffman Prairie and walk where the Wright Brothers taught the world to fly!

MILITARILY CRITICAL TECHNICAL DATA AGREEMENT				Form Approved OMB No. 0704-0207 Expires Jun 30, 2001	
(Please read Privacy Act Statement and Instructions on back before completing this form.)					
<p>The public reporting burden for this collection of information is estimated to average 20 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0207), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p> <p>PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE ABOVE ADDRESS. RETURN COMPLETED FORM TO: UNITED STATES/CANADA JOINT CERTIFICATION OFFICE, DEFENSE LOGISTICS INFORMATION SERVICE, FEDERAL CENTER, 74 WASHINGTON AVE., NORTH, BATTLE CREEK, MI USA 49017-3084</p>					
1. TYPE OF SUBMISSION (X one)		a. INITIAL SUBMISSION	b. RESUBMISSION	XX c. REVISION	d. 5-YEAR RENEWAL
2. INDIVIDUAL OR ENTERPRISE DATA (Referred to as a "certified contractor" upon acceptance of certification by the U.S./Canada - JCO)					
a. NAME Lockheed Martin Corporation			b. ADDRESS (Include Province and/or 9-digit ZIP Code) P.O. Box 748 Lockheed Blvd Fort Worth, TX 76101-0748 USA		
c. NAME OF SUBSIDIARY/DIVISION Lockheed Martin Aeronautics Company					
d. FSCM/FSCNM/CAGE/DSS VENDOR CODE 81755			e. TELEPHONE NUMBER (Include Area Code) 817-777-2000		
3. DATA CUSTODIAN V. G. Harris					
a. NAME OR POSITION DESIGNATION (See Instructions) V.G. Harris			b. BUSINESS MAILING ADDRESS (Include Province and/or 9-digit ZIP Code) P.O. Box 748 MZ 2246 Fort Worth, TX 76101-0748 USA		
c. TELEPHONE NUMBER (Include Area Code) 817-763-1791					
d. TITLE Librarian					
4. DESCRIPTION OF RELEVANT BUSINESS ACTIVITY (Print or type) Design and construction of advanced military aircraft and derivatives. Also, retrofit and modifications of existing aircraft platforms.					
5. AS A CONDITION OF RECEIVING MILITARILY CRITICAL TECHNICAL DATA, THE INDIVIDUAL OR ENTERPRISE CERTIFIES THAT:					
a.(1) CITIZENSHIP/RESIDENCY STATUS. The individual designated either by name or position designation in Item 3, who will act as custodian of the militarily critical technical data on behalf of the contractor, is: (X (a), (b), (c), or (d))			c.(2) agree not to disseminate militarily critical technical data in a manner that would violate applicable U.S. or Canadian export control laws and regulations.		
XXX (a) A U.S. CITIZEN			(b) A CANADIAN CITIZEN		
or a person admitted lawfully for permanent residence into:			d. They will not provide access to militarily critical technical data to persons other than their employees or eligible persons designated by the registrant to act on their behalf unless such access is permitted by U.S. DoDD 5230.25, Canada's TDCR, or by the U.S. or Canadian Government agency that provided the technical data.		
(c) THE UNITED STATES			(d) CANADA		
(2) BUSINESS LOCATION. Business of individual listed in Item 3 is located in: X (a) or (b)			e. No person employed by the enterprise or eligible persons designated by the registrant to act on their behalf, who will have access to militarily critical technical data, is disbarred, suspended, or otherwise ineligible to perform on U.S. or Canadian Government contracts or has violated U.S. or contravened Canadian export control laws or has had a certification revoked under the provisions of U.S. DoDD 5230.25 or Canada's TDCR.		
XXX (a) THE UNITED STATES			(b) CANADA		
b. The data are needed to bid or perform on a contract with any agency of the U.S. Government or the Canadian Government or for other legitimate business activities in which the contractor is engaged, or plans to engage.			f. They are not themselves debarred, suspended, or otherwise ineligible to perform on U.S. or Canadian Government contracts, and have not violated U.S. or contravened Canadian export control laws, and have not had a certification revoked under the provisions of U.S. DoDD 5230.25 or Canada's TDCR.		
c. They (1) acknowledge all responsibilities under applicable U.S. export control laws and regulations (including the obligation, under certain circumstances, to obtain an export license from the U.S. Government prior to the release of militarily critical technical data within the United States) or applicable Canadian export control laws and regulations, and					
6. CONTRACTOR CERTIFICATION I certify that the information and certifications made by me are true, complete, and accurate to the best of my knowledge and belief and are made in good faith. I understand that a knowing and willful false statement on this form can be punished by fine or imprisonment or both. (For U.S. contractors see U.S. Code, Title 18, Section 1001 and for Canadian contractors see Section 26 of the Defense Production Act.)					
a. TYPED NAME (LAST, First, Middle Initial) Summers, Tom J.		b. TITLE Manager Contracting Processes		c. SIGNATURE <i>Tom J. Summers</i>	
				d. DATE SIGNED 5/16/00	
7. CERTIFICATION ACTION (X one)					
X a. CERTIFICATION ACCEPTED. This certification number, along with a statement of intended data use, must be included with each request for militarily critical technical data.				NUMBER 0000531	
b. RETURNED. Insufficient information:					
c. REJECTED. Does not meet eligibility requirements of DoDD 5230.25 or of Canada's TDCR.					
8. DOD OFFICIAL			9. CANADIAN OFFICIAL		
a. TYPED NAME (LAST, First, Middle Initial) Larry G. Troveta			a. TYPED NAME (LAST, First, Middle Initial) Robert H. Davidson		
b. TITLE U.S. Representative U.S./Canada Joint Certification Office			b. TITLE Canadian Representative U.S./Canada Joint Certification Office		
c. SIGNATURE <i>Larry G. Troveta</i>		d. DATE SIGNED MAY 24 2000		c. SIGNATURE <i>Robert H. Davidson</i>	
				d. DATE SIGNED MAY 24 2000	

**SOCIETY FOR THE ADVANCEMENT OF
MATERIAL AND PROCESS ENGINEERING**



“WARNING—This document contains technical data whose export is restricted by the Arms Export Control Act (Title 22, U.S.C., Section 2751, et. seq.). Violation of this export law is subject to severe criminal penalties. Disseminate in accordance with provisions of DoD Directive 5230.25.”

***Materials and Processing: Enabling Flight. . .
Our Legacy and Our Future
2003***

AS

Office Action Summary

Application No.

09/938,065

Applicant(s)

BERSUCH ET AL.

Examiner

Gladys J Piazza Corcoran

Art Unit

1733

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1733

DETAILED ACTION

Specification

1. The amendment filed July 14, 2003 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: There is no support in the original Specification for "Inner surfaces 43, 45 are perpendicular to each other, and the outer side is slightly concave." The original drawing figures do not clearly show that the surfaces 43 and 45 are perpendicular to each other nor that the outer side is concave.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Objections

2. Claim 14 is objected to because of the following informalities:
- a. Claim 5 recites, "outer surface of the base and the legs preform" which should be -- outer surface of the base and the legs of the perform--.
 - b. Claim 14 recites, "to remove tool" which should be --to remove the tool--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 1733

4. Claims 9, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
- ✓ 5. Claim 9 recites the limitation "the components" in line 2. There is insufficient antecedent basis for this limitation in the claim. Since there are first and second components in claim 1, it is unclear which component is being referred to in claim 9. It is noted that there is no support in the original specification for the second component being vacuum bagged during the step of inserting a sizing tool between the legs and curing the resin while the tool is located between the legs to define a slot. It is suggested to amend to --the first component--.
- ✓ 6. Claim 17 recites the limitation "the components" in line 2. There is insufficient antecedent basis for this limitation in the claim. Since there are first and second components in claim 12, it is unclear which component is being referred to in claim 17. It is noted that there is no support in the original specification for the second component being vacuum bagged during the step of inserting a sizing tool between the legs and curing the resin and film adhesive while the tool is located between the legs to define a slot. It is suggested to amend to --the first component--.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1733

8. Claim 1, 2, 4, 7-12, 14, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wanthal et al. ("Interlaminar Reinforced Composites Development for Improved Damage Tolerance") optionally in view of Hertzberg (US Patent No. 4,966,802) and further optionally in view of Kohler (US 5,476,704).

2-18-19
Wanthal discloses a method for assembling first and second components by providing a woven pre-form having a base and a pair of spaced apart legs extending from the base (p. 2- woven 3D textile pre-forms; p. 13 pi-shaped pre-form), infusing the pre-form with resin and applying the pre-form onto a first component (pre-preg tape lay-up), then inserting a sizing tool between the legs and curing the resin while the tool is located between the legs to define a slot, then removing the tool (this is considered inherent in order to adhere the second component into the slot) and applying adhesive into the slot, then inserting the second component into the slot, the adhesive in the slot adhering at least one surface of the second component to at least one inner surface of the slot for retaining the second component within the slot (page 13, lines 7 - 14).

As to the limitation that the base of the pre-form is adhered to the first component prior to cure, the assembly of the uncured pre-form and the pre-preg lay-up is considered to read on "adhering the pre-form to the first component" due to the uncured resin in the parts causing adhesion between the parts. Optionally, Hertzberg is cited to show that it is known in the art to provide an adhesive between parts of structural assemblies to adhere the parts together prior to curing in order to prevent delamination and provide a stronger bond than the prior art methods of only utilizing the un-cured resin in the parts for bonding during curing (column 1, lines 19-16; column 3, lines 25-

Nothing new about the
idea for engaging the adhesive
between the parts & the
pre-form.

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31). Hertzberg further discloses that the adhesive is placed between the joined surfaces of the parts of the structural assembly and then the structural assembly is cured (column 2, lines 55-68; column 4, line 47 to column 5, line 8; column 9, line 41). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of assembling first and second components as shown by Wanthal by providing adhesive between the interfaces of pre-form and the components in order to reduce delamination and provide a stronger bond as shown by Hertzberg.

As to the limitations that the adhesive is provided in the slot prior to inserting the second component, that the adhesive adheres at least one surface of the second component to at least one surface of the inner surface of the slot and that the second component has a smaller width than the tool, these are considered to be necessary steps in order to paste bond the pre-cured laminate in the pi-clevis using adhesive as disclosed by Wanthal. Additionally, such steps would have been well within the purview of one of ordinary skill in the art in order to perform the method as disclosed by Wanthal. For example, it is well within the purview of one of ordinary skill in the art adhering components together to apply adhesive to either of the parts to be adhered prior to bringing the parts together. Furthermore, one of ordinary skill in the art would readily appreciate that the sizing tool must be larger in width than the second component in order to accommodate both the paste adhesive that is applied in the slot and the second component. Optionally, Kohler discloses one example in the art of adhering a web panel to a Pi-shaped structural component by applying adhesive (4) between the second component and the sides of the flanges; such clearance of the

Pultruded

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adhesive and the second component must be larger than the tool used in the method of Wanthal. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of assembling components together as shown by Wanthal by performing steps that would have been well within the purview of one of ordinary skill in the art when adhering components together as further optionally exemplified by Kohler.

As to claim 2, Hertzberg as discussed above discloses providing adhesive films between component parts in order to provide a stronger bond. As to claim 4, Wanthal discloses that the tool is coated with a non-stick material (release agent), such a coating is conventionally considered to prevent adhesion of the tool to the molded parts and to reduce the force needed to remove the tool after curing. As to claims 7 and 8, Wanthal discloses a Pi shaped pre-form which is conventionally considered to have legs perpendicular to a base and legs parallel to each other. As to claim 9, Wanthal discloses that the assembly of the first component and perform and tool were "bagged and autoclave cured". It is considered conventional in this art that "bagged" curing refers to curing in a vacuum bag. As to claim 10, as discussed above, it would have been well within the purview of one of ordinary skill in the art to provide the tool with a width greater than the second component in order to provide a clearance for the adhesive and the second component within the slot, furthermore, Kohler shows an example of providing a second component within a pi-shaped pre-form with adhesive along the sides of the second component (where a clearance would be required to provide the adhesive along the sides). As to claim 11, Wanthal discloses paste bonding

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a second component in the slot. One of ordinary skill in the art would readily appreciate applying the adhesive by coating the inside surfaces of the legs with adhesives in order to adhere the sides of the component to the legs of the slot. Furthermore, as discussed above, Kohler shows a component within a Pi-shaped slot where adhesive is applied to the inside surfaces of the legs. Most of the limitations of claim 12 have been addressed in reference to claims 1, 8, and 11 above. Wanthal discloses the pre-form is 3 dimensional and the adhesive in the slot is a paste adhesive. As discussed above, Hertzberg discloses providing a film adhesive between component parts where the adhesive is cured during the cure of the parts. As to claim 14, Wanthal discloses that the tool is coated with a non-stick material (release agent), such a coating is conventionally considered to reduce the force needed to remove the tool after curing. As to claim 17, Wanthal discloses that the assembly of the first component and perform and tool were "bagged and autoclave cured". It is considered conventional in this art that "bagged" curing refers to curing in a vacuum bag.

9. Claims 3, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wanthal et al. optionally in view of Hertzberg and further optionally in view of Kohler as applied to claims 1, 12 above, and further in view of Beck et al. (US Patent No. 4,946,369).

Wanthal disclose providing a coating of release agent on the tool inserted in the clevis joint slot. It is well known in the art of curing structural components to provide peel plies or release papers to molds in order to be able to separate the mold from the structural parts after curing. For example, Beck discloses an example of silicone molds

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for molding structural composite parts where a peel ply is provided between the composite layers to be molded and the silicone mold. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of assembling the components as shown by Wanthal with a peel ply between the molding tool and the pre-form in order to properly separate the mold from the pre-form after curing as is considered well known in the art and further exemplified by Beck.

10. Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wanthal et al. optionally in view of Hertzberg and further optionally in view of Kohler as applied to claims 1, 12 above, and further in view of Barnes (US Patent No. 6,007,894) and/or Sloman (WO 98/50214).

It is considered well known in the art when curing structural laminates to provide semi-rigid over-presses against the outer surfaces of pre-forms and then placing the entire assembly with the over-presses in a vacuum bag in order to distribute force across the outer surfaces of the pre-form. For example, Barnes discloses a method of curing a structural member by providing an at least semi-rigid over-press (silicone rubber blocks 221) against the outer surface of a pre-form (body sheet 53) (against the base and the exterior of the leg portion) in order to cause the over-press to press the pre-form against the other structural assembly parts (see figure 25; column 8, lines 30-35, column 9, lines 14-33). The over-pressed in Barnes are triangular in cross section (column 6, lines 12-19; column 8, lines 45 and 46). Additionally, Sloman discloses a method of curing a structural member by providing an at least semi-rigid over-press against the outer surface of a pre-form in order to cause the over-press to press the pre-

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form against the other structural assembly parts (pages 1, 3). In particular, over-presses are used for the female features on the non-molded side of the component (page 1). A semi-rigid over-press for a corner concave region is arranged on the composite corner with a base side on the base and a leg side on the leg and an exterior side that extends from an edge of the base side to the edge of the leg side (page 6; figure 2). The over-presses are generally triangular in cross section (see figure 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of assembling components as shown by Wanthal, optionally Hertzberg and Kohler, by providing over-presses along the legs and base of the pre-form in order to distribute force across the outer surfaces of the pre-form and to provide proper pressure and molding to the corner structure of the composite during vacuum molding as is well known in the art and exemplified by Barnes and/or Sloman.

11. Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wanthal et al. optionally in view of Hertzberg and further optionally in view of Kohler as applied to claims 1, 12 above, and further in view of Bersuch et al. (Affordable Composite Structure for Next Generation Fighters) and/or Sheahen et al. (Robust Composite Sandwich Structures) and/or Owens et al. (Tension Pull-off and Shear Test Methods to Characterize 3-D Textile Reinforced Bonded Composite Tee-Joints).

It is well known in the art of bonding structural composites to adhere over-wrap plies to pre-forms in order to provide a more secure joint. For example, Bersuch (page 9) and/or Sheahen (pages 6-7) and/or Owens (page 404, figure 7) disclose applying composite over-wrap plies on an exterior surface of a woven pre-form. It would have

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been obvious to one of ordinary skill in the art at the time of the invention to provide the method of assembling component parts as shown by Wanthal, optionally Hertzberg and Kohler, by adhering over-wrap plies to the pre-form as is well known in the art in order to provide a more secure bond and as further exemplified by Bersuch and/or Sheahen and/or Owens.

As to claim 16 it is noted that the over-wrap plies in Owens also adhere to the adhesive film between the pre-form and the component.

12. Claims 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wanthal et al. in view of Hertzberg and further optionally in view of Kohler as applied to claims 1, 12 above, and further in view of Breuer et al. (DE 19832441 C1 with English equivalent US Patent No. 6,306,239).

Wanthal discloses that the assembly of the first component and perform and tool were "bagged and autoclave cured". It is considered conventional in this art that "bagged" curing refers to curing in a vacuum bag. Furthermore, Breuer is cited to show it is known bond structural assemblies by vacuum bagging the components and the pre-form to ensure proper shaping and bonding (column 7, lines 30-40). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of assembling components as shown by Wanthal by curing in a vacuum bag as suggested by Wanthal and considered conventional and further exemplified by Breuer.

13. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wanthal et al. in view of Hertzberg and further optionally in view of Kohler and further in view of Beck et al. as applied to claim 3 above, and further optionally in view of Breuer et al.

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(DE 19832441 C1 with English equivalent US Patent No. 6,306,239) and further in view of Barnes (US Patent No. 6,007,894) and/or Sloman (WO 98/50214).

Most of the limitations of claim 18 are met by the references as discussed above in claims 1, 3, 7, 9, 12, 17. Additionally, Wanthal discloses the second component is pre-cured (page 13).

As to the limitation that the first component is a composite member that is pre-cured, the first component in Wanthal is disclosed as being a pre-preg lay-up. Pre-pregs are by definition partially cured, therefore they are considered to be "pre-cured" (the claim does not require that the part be entirely cured). Optionally, Breuer is cited to show it is known in the art to bond stiffener pre-forms to first component skins where the first component skin is either un-cured or pre-cured (column 5, lines 23-40). It would have been obvious to one of ordinary skill in the art at the time of the invention to one of ordinary skill in the art at the time of the invention to provide the method of assembling components as shown by Wanthal by providing the first component as a pre-cured part as is considered a well known alternative to providing an uncured or pre-preg part as exemplified by Breuer. Only the expected results would be attained.

As to the limitation of providing semi-rigid over-presses, it is considered well known in the art when curing structural laminates to provide semi-rigid over-presses against the outer surfaces of pre-forms and then placing the entire assembly with the over-presses in a vacuum bag in order to distribute force across the outer surfaces of the pre-form. For example, Barnes discloses a method of curing a structural member by providing an at least semi-rigid over-press (silicone rubber blocks 221) against the

outer surface of a pre-form (body sheet 53) (against the base and the exterior of the leg portion) (in a vacuum bag) in order to cause the over-press to press the pre-form against the other structural assembly parts (see figure 25; column 8, lines 30-35, column 9, lines 14-33). Additionally, Sloman discloses a method of curing a structural member by providing an at least semi-rigid over-press against the outer surface of a pre-form (in a vacuum bag 19) in order to cause the over-press to press the pre-form against the other structural assembly parts (pages 1, 3). In particular, over-presses are used for the female features on the non-molded side of the component (page 1). A semi-rigid over-press for a corner concave region is arranged on the composite corner with a base side on the base and a leg side on the leg and an exterior side that extends from an edge of the base side to the edge of the leg side (page 6;figure 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of assembling components as shown by Wanthal by providing over-presses along the legs and base of the pre-form in order to distribute force across the outer surfaces of the pre-form and to provide proper pressure and molding to the corner structure of the composite during vacuum molding as is well known in the art and exemplified by Barnes and/or Sloman.

Double Patenting

14. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

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A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

15. Claims 1, 2, 4, 7-12, 14, 17 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 6 of copending Application No. 09/946627 in view of Hertzberg and Kohler (optionally further in view of Wanthal for claims 4, 7, 8, 9, 12, 14, 17.)

Claim 6 in 09/946627 discloses the limitations of providing a woven pre-form having a base and a pair of spaced apart legs extending from the base (step a), infusing the pre-form with resin (step a), inserting a sizing tool between the legs and curing the resin while the tool is located between the legs to define a slot (claim 6 and step d) then removing the tool and applying an adhesive into the slot then inserting the second component into the slot the adhesive bonding the second component to the pre-form (claim 6), the second component having a smaller width than the tool (claim 6). As to the limitation of adhering the base of the pre-form to the first component, such is shown by the reference Hertzberg as set forth above. As to the limitation of adhering at least one surface of the second component to at least one inner surface of the slot for retaining the second component within the slot, such is shown by the reference Kohler as set forth above. Claim 2 is disclosed by Hertzberg as discussed above. Claim 10 is disclosed by claim 6 in 09/946627. Kohler discloses claim 11 as discussed above. Claims 4, 7, 8, 9, 12, 14, 17 are met by the reference Wanthal as discussed above.

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This is a provisional obviousness-type double patenting rejection.

16. Claims 3, 13 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 6 of copending Application No. 09/946627 in view of Hertzberg and Kohler as discussed above and further in view of Beck et al.

This is a provisional obviousness-type double patenting rejection.

17. Claims 5, 15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 6 of copending Application No. 09/946627 in view of Hertzberg and Kohler as discussed above and further in view of Barnes (US Patent No. 6,007,894) and/or Sloman (WO 98/50214) as set forth above.

This is a provisional obviousness-type double patenting rejection.

18. Claims 6, 16 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 6 of copending Application No. 09/946627 in view of Hertzberg and Kohler as discussed above and further in view of Bersuch et al. and/or Sheahen et al. and/or Owens et al. as set forth above.

This is a provisional obviousness-type double patenting rejection.

19. Claim 18 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 6 of copending Application No. 09/946627 in view of Hertzberg and Kohler as discussed above and

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further in view of Beck et al. as applied to claim 3 above, and further optionally in view of Breuer et al. and further in view of Barnes and/or Sloman as set forth above.

This is a provisional obviousness-type double patenting rejection.

20. Claims 1, 2, 4, 7–12, 14, 17 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 3 of copending Application No. 09/973208 in view of Wanthal and Hertzberg and Kohler.

Claim 3 in 09/973208 discloses the limitations of providing a woven pre-form having a base and a pair of spaced apart legs extending from the base (step d), inserting a sizing tool between the legs and curing the resin while the tool is located between the legs to define a slot (claim 3 and step f) then removing the tool and applying an adhesive into the slot then inserting the second component into the slot the adhesive bonding the second component to the pre-form (claim 3 and Wanthal or Kohler), the second component having a smaller width than the tool (claim 3 and Kohler). As to the step of infusing the pre-form with resin such is known as shown by Wanthal or Hertzberg. As to the limitation of adhering the base of the pre-form to the first component, such is shown by the reference Hertzberg as set forth above. As to the limitation of adhering at least one surface of the second component to at least one inner surface of the slot for retaining the second component within the slot, such is shown by the reference Kohler as set forth above. Claim 2 is disclosed by Hertzberg as discussed above. Claim 10 is disclosed by claim 6 in 09/946627. Kohler discloses claim 11 as discussed above. Claims 4, 7, 8, 9, 12, 14, 17 are met by the reference Wanthal as discussed above.

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This is a provisional obviousness-type double patenting rejection.

21. Claims 3, 13 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 3 of copending Application No. 09/973208 in view of Wanthal and Hertzberg and Kohler as discussed above and further in view of Beck et al.

This is a provisional obviousness-type double patenting rejection.

22. Claims 5, 15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 6 of copending Application No. 09/946627 in view of Hertzberg and Kohler as discussed above and further in view of Barnes (US Patent No. 6,007,894) and/or Sloman (WO 98/50214) as set forth above.

This is a provisional obviousness-type double patenting rejection.

23. Claims 6, 16 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 3 of copending Application No. 09/973208 in view of Wanthal and Hertzberg and Kohler as discussed above and further in view of Bersuch et al. and/or Sheahen et al. and/or Owens et al. as set forth above.

This is a provisional obviousness-type double patenting rejection.

24. Claim 18 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 3 of copending Application No. 09/973208 in view of Wanthal and Hertzberg and Kohler as discussed above and further in view of Beck et al. as applied to claim 3 above, and further

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optionally in view of Breuer et al. and further in view of Barnes and/or Sloman as set forth above.

This is a provisional obviousness-type double patenting rejection.

Response to Amendment

25. The Declaration filed on December 31, 2003 has been considered but is insufficient to prove the Wanthal reference is not prior art, see discussion below.

Response to Arguments

26. Applicant's arguments filed March 4, 2004 have been fully considered but they are not persuasive.

Applicant argues on page 5-6, that citing the Wanthal reference in an IDS is not an inherent admission that the document is prior art. Examiner agrees, merely citing a reference in an Information Disclosure statement is not an admission that the document is prior art.

Applicant argues on pages 6-10 that the Declaration outlining the underlying facts and circumstances surrounding the Wanthal document with the legal analysis on "printed publications" prove that Wanthal is not prior art. It appears that the Declaration filed on December 31, 2003 by Stephen D. Owen is sufficient to show that the Wanthal reference is not a "printed publication". There appears to be no evidence that the Wanthal reference was distributed as a paper document or any other "printed" form. However, if the paper was distributed without restriction, then the paper would be considered a "printed publication" (see MPEP § 2128). Regardless, the Declaration is

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not sufficient to show that the Wanthal reference is not prior art as further discussed below under 35 USC §102(a) as "known by others".

Applicant argues on page 10 that the Wanthal paper does not establish that the invention was "known by others" in this country before the invention by the applicant within the meaning of 35 USC §102(a). The Declaration filed on December 31, 2003 by Stephen D. Owen is not sufficient to show that the Wanthal reference was not "known by others" in this country before the invention by the applicant within the meaning of 35 USC §102(a). There is not sufficient evidence to show that the oral presentation where the Wanthal reference was presented was not accessible to the public. The presentation was presented at a session of the Society for Advancement of Material and Process Engineering (SAMPE) in 2000. *It is noted that Examiner has requested for the particular date of the oral presentation, however Appellant has failed to provide such information.* While the declaration asserts that these sessions are generally restricted to those having certification credentials or employed by a company that is qualified as a US contractor access list, there is no information as to the particular session in which this paper was presented. Furthermore, even if the particular session in which this paper was presented was restricted as described generally in the declaration, those persons who attended the session are considered to be interested and ordinarily skilled in the subject matter or art (joining of stiffeners to skins, particularly in the aircraft industry). There is no evidence that those attending the session were required to keep the information learned at the session confidential. It is also noted that the subject matter of the Wanthal reference relied on is not of a technical level that would prevent

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persons attending the session from immediately understanding the subject matter from the oral presentation. It appears that the presentation of the paper was also "in this country" as it was for a US organization (SAMPE) with US government employees and contractors attending, however Appellant has not provided this information. The authors of the Wanthal references meets the "by others" requirement. None of the authors of the Wanthal reference are inventors in the present application; additionally it is noted that the reference cites acknowledgments to others in particular those who contributed to the development and testing of the subject matter. It is further noted that there is no evidence of a confidentiality agreement between the authors. Consequently, the declaration has not sufficiently provided support that the Wanthal reference is not prior art.

Applicant's arguments on pages 10-24 are directed toward the secondary references individually and not in combination with the primary, Wanthal reference. Consequently, these arguments will not be addressed.

Applicant argues on pages 15, 21-22, 24, that the reference Sloman does no suggest that the caul plates or pressure intensifiers are generally triangular in cross-section to distribute a force across the composite components. Both the pressure intensifiers in Barnes (discussed above) and Sloman are triangular in cross section (see figure 2 and page 6 in Sloman).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gladys J Piazza Corcoran whose telephone number is

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(571) 272-1214. The examiner can normally be reached on M-F 8am-5:30pm (alternate Fridays off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Gladys JP Corcoran
Examiner
Art Unit 1733

GJPC

Notice of References Cited	Application/Control No. 09/938,065	Applicant(s)/Patent Under Reexamination BERSUCH ET AL.	
	Examiner Gladys J Piazza Corcoran	Art Unit 1733	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-4,966,802	10-1990	Hertzberg, Paul E.	428/119
	B	US-6,007,894	12-1999	Barnes et al.	428/120
	C	US-6,306,239	10-2001	Breuer et al.	156/245
	D	US-4,946,369	08-1990	Beck et al.	427/133
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N	DE 19832441 C1	01-2000	Germany	BREUER et al.	B29C 70/42
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

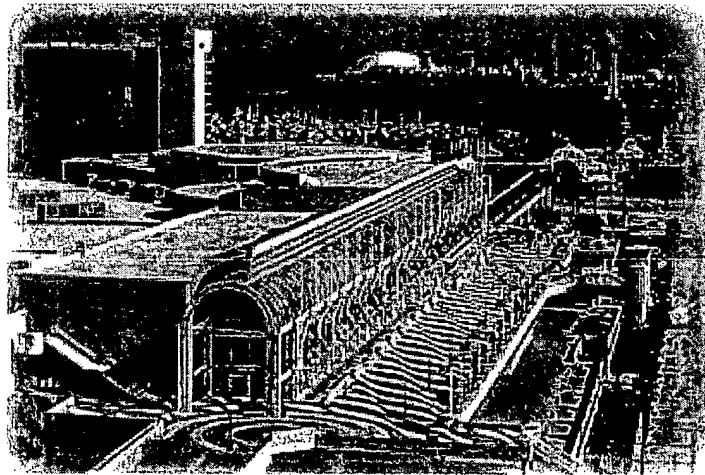


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- **National Institute of Standards and Technology - NIST/Advanced Technology Program (ATP) funded program, NIST Federal Working Group on Composite Materials and NIST Task Force Meeting**
- **Naval Air Systems Command - Supplying our Keynote Speaker**
- **Office of Scientific Research - "Advanced Polymeric Materials for Space Applications" forum**
- **SACMA - Spring Meeting and Conference**

REGISTRATION HOURS

Registration will be open at the Long Beach Convention Center:

Sunday, May 21 1:00 p.m. - 6:00 p.m.

Monday, May 22 7:30 a.m. - 5:00 p.m.
Tuesday, May 23 7:15 a.m. - 5:00 p.m.
Wednesday, May 24 7:15 a.m. - 5:00 p.m.
Thursday, May 25 7:30 a.m. - 1:30 p.m.

EXHIBIT HOURS

Monday, May 22 12:00 p.m. - 5:00 p.m.
Tuesday, May 23 9:00 a.m. - 5:00 p.m.
Wednesday, May 24 9:00 a.m. - 5:00 p.m.

No Exhibits on Thursday

EXHIBIT HALL ADMISSION

All Conference registrants will auto-matically be admitted to the exhibits with their badges. There will be a \$25 admission fee for anyone without a complimentary pass and wanting ad-mittance to the exhibits only. Registration for the exhibits only and payment of admission fee can be done at the SAMPE Registration area at the Con-vention Center. Those attendees with complimentary passes must register in the same area to obtain a badge.

All Must be Registered and Have a Badge to Enter the Exhibit Area

For your information, you might want to see last years ISSE website located at [ISSE44 General Information](#).



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SAMPE® 2000 Final Program

Tutorials

Sunday Afternoon | May 21

2:00 p.m., Room 101A

Resin Infusion Processes: RTM, VARTM, SCRIMP, and VIP Technology, Dr. Scott W. Beckwith, Beckwith Technology Group, LLC, Murray, UT

2:00 p.m., Room 101B

Composite Materials: Introduction and Overview, Dr. Linda L. Clements, L&C Technologies, Dayton, NV

2:00 p.m., Room 102A

Smart Structures and Materials Technology, Dr. James A. Harvey, Under-the-Bridge-Consulting, Corvallis, OR

2:00 p.m., Room 102B

Joining Composite Structures: Design, Analysis, and Issues, Dr. Rikard B. Heslehurst, Australian Defence Force Academy, Canberra, Australia

Workshop

Sunday Afternoon | May 21

2:00 p.m., Room 102C

Introduction to MIL-17 Composites Handbook, Gerald V. Flanagan, Materials Science Corporation, Fort Washington, PA

Tutorials

Monday Morning | May 22

9:00 a.m., Room 101A

Composite Tooling Fundamentals and Re-Usable Elastomeric Bagging, Jon

P. Grigson and Kevin S. Jackson, The Advanced Composites Group, Tulsa, OK

9:00 a.m., Room 101B

Composite Structures: Fabrication and Manufacturing Processes, Dr. James C. Leslie, Advanced Composite Products & Technology, Huntington Beach, CA

9:00 a.m., Room 102A

Composite Damage and Structural Repair Methodology, Robert J. Ducar, Jordam Nacelle and Thrust Reverser Division, Tulsa, OK

9:00 a.m., Room 102B

Sandwich Structures Design and Manufacturing Considerations, Prof. Steven R. Nutt, University of Southern California/Center for Composite Materials, Los Angeles, CA

Tutorials

Monday Afternoon | May 22

2:00 p.m., Room 101B

Design and Analysis of Composites, Dr. Daniel O. Adams, University of Utah, Mechanical Engineering, Salt Lake City, UT

2:00 p.m., Room 101A

Automated Processing for Low-Cost Composites, Stanley T. Peters, Process Research, Mountain View, CA

2:00 p.m., Room 102B

Textile Technology: Applications for Structural Composites, Dr. Frank C. Ko, Drexel University/Fibrous Materials Research Center, Philadelphia, PA

Session 1A

Monday Afternoon | May 22

Room 103C

Closed Session

Composites Affordability Initiative Program

Chairmen: Dr. Frances Abrams, Air Force Research Laboratory, WPAFB, OH and Scott Holmes, The Boeing Company, St Louis, MO

1:00 p.m. The Composites Affordability Initiative, Phase II, Pervasive Technology Overview, B. Butler, Northrop Grumman Corporation, El Segundo, CA; F. Abrams, A.F. Research Laboratory, WPAFB, OH

1:30 p.m. Composites Affordability Initiative Cost Analysis Tool (CAICAT), S. Saha, C. Teng, Northrop Grumman Corporation, El Segundo, CA; B. Tom, Lockheed Martin Corporation; J. Falque, K. Schinzing, The Boeing Company, Seattle, WA; S. Mitchell, General Electric Corporation; A. Herner, U.S. Air Force, WPAFB, OH; R. Raman, Naval Air Warfare Center, Patuxent River, MD

2:00 p.m. Interlaminar Reinforced Composites Development for Improved Damage Tolerance, S. Wanthal, R. Wippich-Dienhart, A. Cenedella, The Boeing Company, St. Louis, MO; G. Mabson, L. Deobald, The Boeing Company, Seattle, WA; S. Owens, Lockheed Martin, Fort Worth, TX; V. Li, D. Kane, Northrop Grumman Corporation, El Segundo, CA

2:30 p.m. Resin Flow Monitoring in Aerospace Composites, J.H. Belk, J.E. Pado, C.L. Brown, A.F. Tegeler, M. Vandernoot, The Boeing Company, St. Louis, MO; B. Harshberger, Northrop Grumman Corporation, Gardena, CA; S. Walsh, R. Mohan, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD; K. Han, University of Dayton Research Institute, Dayton, OH

3:00 p.m. Vacuum Assisted Resin Transfer Molding in the Composites Affordability Initiative, B. Bhombal, Northrop Grumman Corporation, El Segundo, CA; G.L. Hahn, The Boeing Company, St. Louis, MO

3:30 p.m. Recent Advances in Fiber Placement for Affordable Aircraft Structures, J.M. Criss, Lockheed Martin Aeronautical Systems, Marietta, GA; S.T. Holmes, The Boeing Company, St Louis, MO; K.M. Franklin, Alliant Techsystems, Clearfield, UT

4:00 p.m. Wing Producibility Demonstration Article Composites Affordability Initiative, D. Shimazu, Northrop Grumman Corporation, El Segundo, CA

4:30 p.m. A Producibility Demonstration for Forward Center Fuselage,

F. Tyahla, A. Cenedella, R. Engelbart, N. Froeschner, S. Holmes, T. McMahon, J. Waldrop, The Boeing Company, St Louis, MO; T. Faoro, Lockheed Martin, Fort Worth, TX

Session 1B

Monday Afternoon | May 22

Room 102C

Composite Damage and Repair

Chairman: Michael Hoke, Abaris Training Resources, Reno, NV

1:00 p.m. The Cost of Water Ingression of Honeycomb Repair and Utilization, J.E. Shafizadeh, J.C. Seferis, University of Washington/Chemical Engineering, Seattle, WA; E.F. Chesmar, United Airlines-SFOEG, San Francisco, CA

1:30 p.m. Design of Experiment to Measure Water Migration Through Honeycomb Core on United Airlines 767s, J.E. Shafizadeh, J.C. Seferis, University of Washington/Chemical Engineering, Seattle, WA; E.F. Chesmar, United Airlines-SFOEG, San Francisco, CA

2:00 p.m. Holographic Interferometric Study of Free Edge Structural Defects, R.B. Heslehurst, University of New South Wales/Australian Defence Force Academy, Canberra, Australia

2:30 p.m. Optimization of Sol-Gel Surface Preparations for Repair Bonding of Aluminum Alloys, D.B. McCray, University of Dayton Research Institute, Dayton, OH; J.J. Mazza, A.F. Research Laboratory/MLSA, WPAFB, OH

3:00 p.m. Comparison of Two Scarf Repair Configurations, R.B. Heslehurst, L.C. Dorworth, M.J. Hoke, Abaris Training Resources, Reno, NV

Session 1C

Monday Afternoon | May 22

Room 202A

Prepreg Technology

Chairman: Craig W. Schiffman, Thiokol TCR Composites, Ogden, UT

1:00 p.m. Modification of Epoxy Based Carbon Fiber Prepregs Through Combined Liquid and Preformed Rubber Materials, B.S. Hayes, E.N. Gilbert, J.C. Seferis, University of Washington/Chemical Engineering, Seattle, WA

1:30 p.m. Heating Mechanisms in Induction Processing of Carbon Fiber Reinforced Thermoplastic Prepreg, S. Yarlagaadda, H-J. Kim, J.W. Gillespie Jr, University of Delaware/Center for Composite Materials, Newark, DE, N. Shevchenko, B.K. Fink, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD

2:00 p.m. Correlation of Prepreg Tack with Process Performance in Laminated Object Manufacturing, A. Popp, D. Klosterman, R. Chartoff, Univ of Dayton Research Institute/Rapid Prototype Development Laboratory, Dayton, OH

2:30 p.m. Manufacturing and Material Characterization of a New CF-PEEK Prepreg from Woven Textile Structures, A. Woginger, M. Pabler, P. Mitschang, M. Neitzel, University of Kaiserslautern/ Institut fur Verbundwerkstoffe GmbH, Kaiserslautern, Germany

3:00 p.m. "Torayca" T700 Fabric/3680: Self-Adhesive Type Honeycomb Core Cure Prepreg, H. Kishi, A. Nishimura, N. Odagiri, Toray Industries Inc/Composite Materials Research Laboratories, Ehime, Japan

Session 1D

Monday Afternoon | May 22

Room 202B

Process Dimensional Control

Chairman: Dr. John D. Russell, Air Force Research Laboratory/Materials and Manufacturing Directorate, WPAFB, OH

1:00 p.m. Empirical Modeling of In-Cure Volume Changes of 3501-6 Epoxy, R.L. Karkkainen, M.S. Madhukar, University of Tennessee/Mechanical and Aerospace Engineering, Knoxville, TN; J.D. Russell, A.F. Research Laboratory/Materials and Manufacturing Directorate, WPAFB, OH; K.M. Nelson, Boeing Phantom Works, Seattle, WA

2:30 p.m. The Effect of Variation in Prepreg Attributes on Cured Ply

Thickness, M.B. Buczek, D. Backman, GE Aircraft Engines, Cincinnati, OH; S. Darfler, Hexcel Corporation, Dublin, CA

2:00 p.m. Influence of Process Cycle on Residual Stress Development in 3MI Composites, R.Y. Kim, B.P. Rice, A.S. Crasto, University of Dayton Research Institute, Dayton, OH; J.D. Russell, A.F. Research Laboratory/Materials and Manufacturing Directorate, WPAFB, OH

2:30 p.m. Cure Kinetics and the Dimensional Control of Composite Structure, K.M. Nelson, Boeing Phantom Works/Non-Metallic Materials Technology, Seattle, WA; A. Poursartip, G. Fernlund, University of British Columbia/Metals and Materials, Vancouver, Canada

3:00 p.m. Modeling of Process Induced Deformations of Composite Shell Structures, G. Fernlund, A. Poursartip, University of British Columbia/Metals and Materials, Vancouver, Canada; K.M. Nelson, Boeing Phantom Works, Seattle, WA

Session 1E

Monday Afternoon | May 22

Room 103A

Smart Multifunctional Materials

Chairmen: Dr. Hiroshi Asanuma, Chiba University/Electronics and Mechanical Engineering, Chiba, Japan and Larry Coyle, Bell Helicopter Textron, Fort Worth, TX

2:00 p.m. Change in Piezoelectric Potential Against Collision Energy of PZT, R. Kondo, Y. Nishi, Tokai University/Materials Science, Hiratsuka, Japan

2:30 p.m. Growth Rate of Carburizing in Maraging Steel Applied for Continuously Variable Transmission, K. Tanaka, K. Gemma, T. Tanaka, Y. Nishi, M. Kawakami, Tokai University/Materials Science, Hiratsuka, Japan; M. Nishihata, Nippon Bell-Parts Company, Chiba, Japan; S. Yamagata, Oriental Engineering Company, Tokyo, Japan

3:00 p.m. TTT Curve of Quasicrystal Precipitated Alloy, T. Nakamura, T. Okada, H. Ishii, K. Mitsugi, K. Kozawa, Y. Nishi, Tokai University/Physics, Hiratsuka, Japan; K. Oguri, Tokai University/Materials Science, Hiratsuka, Japan

2:30 p.m. Limited Work Hardened Niobium Metal Surface Induced by Water Polishing, Y. Yabe, N. Hagiwara, K. Oguri, T. Suzuki, Y. Nishi, Tokai University/Materials Science, Hiratsuka, Japan

3:00 p.m. Shape Memory Effect of Metallic Glass, H. Yabe, K. Takashina, M. Tetsuka, Y. Nishi, Tokai University/Materials Science, Hiratsuka, Japan

3:30 p.m. Magnetic Shape Memory Fe-Pd Alloy Film Prepared by Magnetron Sputtering, H. Yabe, R. Fujii, Y. Matsumura, H.H. Uchida, H. Uchida, Y. Nishi, Tokai University/Materials Science, Hiratsuka, Japan

4:00 p.m. In-Situ Formation of Sensor and Actuator in Metal Based Composites, H. Asanuma, O. Haga, T. Ishii, H. Kurihara, J. Ohira, G. Nakoda, Chiba University/Electronics & Mechanical Engineering, Chiba, Japan

Session 1F

Monday Afternoon ▮ May 22

Room 202C

Preform Reinforcements

Chairmen: Tobey Cordell, National Composite Center/Aerospace and Defense, Kettering, OH and Andrew Head, A&P Technology Inc, Covington, KY

1:00 p.m. Braided Preform Manufacture for Large Scale, Integrally Stiffened Structures, M. Braley, A&P Technology, Covington, KY

1:30 p.m. Cost Modeling for 3D Woven Preforming Process, L. Dickinson, M. Mohamed, B. Lienhart, 3TEX Inc, Cary, NC

2:00 p.m. Mechanical Property Translation in Oriented, Discontinuous Carbon Fiber Composites, S. Reeve, National Composite Center, Kettering, OH; R. Rondeau, University of Dayton Research Institute, Dayton, OH; G. Bond, The Boeing Company, St Louis, MO; F. Tervet, Lockheed Martin Aeronautical Systems, Marietta, GA

2:30 p.m. The Programmable Powdered Preform Process for Aerospace: Affordable Performance Through Composites, T. Cordell, National Composite Center, Kettering, OH; T. Benson Tolle, A.F. Research Laboratory, WPAFB, OH; R. Rondeau, University of Dayton Research

Institute, Dayton, OH

3:00 p.m. A New Rotary Braiding Machine and CAE Procedures to Produce Efficient 3D-Braided Textiles for Composites, M. Schneider, B. Wulforth, Institute für Textiltechnik der RWTH, Aachen, Germany; A.K. Pickett, Engineering Systems International GmbH, Eschborn, Germany

3:30 p.m. Advanced Manufacturing Techniques Utilizing Carbon Fiber Braid and RTM, D. Swain, R. Abbott, Raytheon Aircraft Company, Wichita, KS

Session 1G

Monday Afternoon | May 22

Room 103B

Carbon Fibers and Novel Carbon Applications-I

Chairmen: Keith Bowman, Air Force Research Laboratory, WPAFB, OH and Kurt Peterson, B.F. Goodrich, Pueblo, CO

1:00 p.m. Low-Cost Carbon Foams for Thermal Protection and Reinforcement Applications, D.K. Rogers, J. Plucinski, Touchstone Research Laboratory, Triadelphia, WV; P.G. Stansberry, A.H. Stiller, F.W. Zondlo, West Virginia University, Morgantown, WV

1:30 p.m. Optimizing Friction Formulation Technique with Emphasis on Golden Section, Y. Lu, M.A. Wright, Southern Illinois University/Center for Advanced Friction Studies, Carbondale, IL

2:00 p.m. Iron-Coated Carbon Fiber for EMI Protection, Z.B. Spencer, B.E. Spencer, Spencer Composite Corp, Lincoln, NE

2:30 p.m. Novel High Temperature Resistant Modified Carbon Coated Glass Fiber, S. Mondal, D. Bhattacharya, A.K. Banthia, Indian Institute of Technology/Materials Science Center, Kharagpur, India

3:00 p.m. Unique Low Modulus Carbon Fibers for Hybrid Materials with Excellent Impact Resistance, N. Kiuchi, Y. Sohda, Nippon Mitsubishi Oil Corporation/Central Technical Research Laboratory, Yokohama, Japan; Y. Arai, Nippon Graphite Fiber Corporation, Himeji, Japan; H. Ohno, M. Shima, Nippon Graphite Fiber Corporation, Tokyo, Japan

Forum

Monday Afternoon | May 22

Room 201A

Advanced Polymeric Materials for Space Applications

Chairmen: Dr. Charles Lee, Air Force Office of Scientific Research, Bolling AFB, DC and Dr. Russell Lipeles, The Aerospace Corporation, Los Angeles, CA

Advanced Composites and polymeric materials that make up many of the structural systems that are used in space applications, exhibit many complex facets from synthesis through manufacture and eventual service applications. This forum has been developed to explore and discuss many of these facets in the form of a discussion panel made up of industry, government, and academic experts knowledgeable of this field. The goal is to spur basic research interests in these areas.

Some of the specific topics which will be covered during this forum on advanced polymeric materials will be:

- Advanced composites and materials for space applications

- Materials for lightweight spacecraft structures

- Use of electronic, photonic, and photovoltaic polymers in space

- Space radiation effects on polymers and polymeric composite materials

- Inflatable structures for space application

- Smart materials and structures in space

The panel members, and audience, will cover some of the key facets involving the use and the issues of these advanced polymeric materials in space applications. The 1980s and 1990s saw significant advances in the development of these new polymeric materials, and in their use and exposure within actual space environments. The panel will discuss the most recent developments, advances, and challenging needs for future materials to support space applications needs. Areas pertaining to space environmental effects upon advanced polymeric materials, composite structures, polymeric coatings and film systems, and related material systems will be covered. The future needs and applications well beyond the year 2000 will be addressed by the assembled group.

The Forum will be organized into two sessions. The Monday afternoon session will focus on needs of polymeric materials in space. The Tuesday afternoon session will include examples of space polymeric

materials research.

Advanced Polymers for Space Applications-I

Advanced Materials Needs

Sponsored by AFOSR

Oral Presentations Only

Chairman: Dr. Charles Lee, Air Force Office of Scientific Research,
Holling AFB, DC

1:00 p.m. USAF Materials and Processing Approaches for Current and
Future Air Force Space Systems Concepts, Michael Stropki, Chief, Space
Materials Office, Materials and Manufacturing Directorate, Air Force
Research Laboratory, WPAFB, OH

1:40 p.m. Applications of Polymeric Materials in Spacecraft, Dr.
Russell A. Lipeles and Dr. Wei H. Kao, The Aerospace Corporation, Los
Angeles, CA

1:20 p.m. Break

2:35 p.m. Photonic Applications for Space, Dr. Todd S. Rose, Dr. Craig
J. Mueller and Dr. Steven C. Moss, The Aerospace Corp, Los Angeles, CA

3:15 p.m. Space Environmental Effects on Polymeric Materials, Dr.
Wayne K. Stuckey and Dr. Michael J. Meshishnek, The Aerospace Corp,
Los Angeles, CA

Keynote Address

Tuesday Morning II May 23

Regency Ballroom ABC

Hyatt Regency Hotel

8:00 a.m. - 9:00 a.m.

Naval Aviation: Breaking the Barriers for a 21st Century Materials
Revolution

Dr. Dale L. Moore, Director, Aerospace Materials Division, National
Materials Competency Leader, Naval Air Systems Command, Patuxent
River, MD

Keynote Panel Session

Tuesday Morning | May 23

Regency Ballroom ABC

Hyatt Regency Hotel

9:00 - 11:45 a.m.

Oral Presentations Only

The Transition to the 21st Century-What You Must be Doing to Ensure Program Success

Moderators: Dr. Leslie Cohen, Cytec Fiberite, Anaheim, CA and Mr. Paul Pendorf, Cytec Fiberite, Marina del Rey, CA

Panel Members:

Ms. Cita M. Furlani, National Institute of Standards and Technology, Acting Director, Advanced Technology Program

Dr. Horst Winkler, VP, Stade Plant, DaimlerChrysler Aerospace Airbus

Dr. William Kessler, VP, Enterprise Products, Lockheed Martin Aerospace Systems

Jim Simpson, Director, Delta Program Development, The Boeing Company

Dr. Lou Montulli, Former Chief of Staff to the U.S. President's Science Advisor

Dr. Darrel Tenney, Director of NASA's Aerospace Vehicle Systems Technology Program

Robert B. Fisher, President, Advanced Glass Fiber Yarns LLC

Dale Moore, Head, Aerospace Materials Division, Naval Air Systems Command

Dr. Masaomi Kadoya, General Director, Japan Aircraft Development Center

Dr. Ilham A. Habibi, EVP, Operations and Commercial, IPTN Indonesia

The history of the advanced materials industry has been one of constant change and these changes are expected to continue well into the next millennium. As we entered the 21st Century, our industry found itself on the threshold of what promises to be explosive growth. The ability to seize opportunities and capitalize on growth will be determined by the leaders of companies throughout the world. This panel consists of distinguished members of industry from companies that are expected to shape the growth of the materials business. They are all key decision makers that will have a significant influence on the future direction of the materials business in this new millennium. They will address topics related to domestic and international issues including sales and marketing opportunities, business environment, protection of intellectual property and other key subjects of interest. The two panel moderators bring a wealth of experience from the domestic and international composite materials market sector. Each panel member will provide a fifteen minute overview on aspects of future materials business opportunities. The presentations will be followed by a question and answer period.

Session 2A

Tuesday Morning | May 23

Room 203B

Composites Durability-I

Chairmen: Jerry Bauer, The Aerospace Corporation, Los Angeles, CA and Dr. Shi Zhang, University of California/San Diego, La Jolla, CA

9:30 a.m. Overview of Polymer Matrix Composites Performance and Materials Development for Aero-Space Applications, R.J. Morgan, E.E. Shin, J. Lincoln, J. Zhou, Michigan State University/Advanced Materials Engineering Experimental Station, Midland, MI

10:00 a.m. Effect of Polymer Molecular Characteristics on Long-Term Engineering Performance, K. Reifsnider, L. Shan, B. Russell, K.N.E. Verghese, Virginia Tech/Engineering Science and Mechanics, Blacksburg, VA; C. Mahieux, ABB Corporation

10:30 a.m. Accelerated Test for Durability of Adhesive Bonds, J.M. Colyer, G.D. Crain, D.W. Jones, Boeing Electronics Systems and Missile Defense, Anaheim, CA

11:00 a.m. The Effects of Long Time Water Exposure on the Durability of Honeycomb Cores, J.E. Shafizadeh, J.C. Seferis, University of Washington/Chemical Engineering, Seattle, WA

11:30 a.m. Hydrolytic Degradation Mechanisms and Kinetics of Polyimides for Advanced Composites, E.E. Shin, R.J. Morgan, J. Zhou, Michigan State University/Advanced Materials Engineering Experimental Station, Midland, MI

Session 2B

Tuesday Morning | May 23

Room 103B

Biomedical Applications

Chairman: John Merlette, Springlite Inc, Salt Lake City, UT

9:30 a.m. Development of a One-Piece Multi-Axial Prosthetic Foot System, E. Rubie, N. Williams, Springlite Inc, Salt Lake City, UT

10:00 a.m. Composite Prosthetic Pylon and Adapter Design, D.A. Taylor, D & P Associates Inc, Indianapolis, IN

10:30 a.m. Preparation and Characterization of Chiton Fiber Reinforced PCL Composite, A. Yang, K. Sun, R. Wu, Shanghai Jiao Tong University/Institute of Composite Materials, Shanghai, China

11:00 a.m. Composite Prosthetic Socket Design and Manufacture, D.A. Taylor, Northwestern University/Biological Materials, Chicago, IL

11:30 a.m. Partial Curing of a Composite Material: A Novel Fabrication Technique for Creating Orthopedic Braces, B.J. Morrison, University of Southern California/Biomedical Engineering, Los Angeles, CA; T.S. Treasy, Univ of Southern California/Center for Composite Materials, Los Angeles, CA; A.A. Polliack, R. Fite, Rancho Los Amigos National Rehabilitation Center, Downey, CA

Session 2C

Tuesday Morning | May 23

Room 203A

Metallics, Ceramics and Nano- composites-I

Chairman: George C. Hansen, Metal Matrix Composites Corporation,
Midway, UT

9:30 a.m. Thermal Degradation of Phenolic Resin/Silica Hybrid Ceramer
Nanocomposites (I), C-C.M. Ma, J-M. Lin, C-T. Kuo, C-T. Hsieh,
National Tsing-Hua University/Chemical Engineering, Hsinchu, Taiwan,
ROC

10:00 a.m. Microstructure and Mechanical Properties of Fiber
Reinforced Magnesium Based Composites Fabricated Using Conventional
Casting, V.V. Ganesh, M. Gupta, National University of
Singapore/Mechanical and Production Engineering, Singapore

10:30 a.m. Processing and Characterization of Monolithic and
Reinforced Materials Fabricated Using a Cost Effective Disintegrated
Melt Deposition Technique, V.V. Ganesh, M. Gupta, National University
of Singapore/Mechanical and Production Engineering, Singapore

11:00 a.m. Microstructure and Mechanical Properties of Mg-Based
Composites Synthesized Using a Novel Mechanical Disintegration and
Deposition Technique, M.K.K. Oo, P.S. Ling, M. Gupta, National
University of Singapore/Mechanical and Production Engineering,
Singapore

11:30 a.m. Optimum Pickling Time of Carbon Steel Prior to Hot-Dip
Galvanizing, H.S. Sarhan, Al-Balqa Applied University/Al-Huson
Polytechnic, Al-Huson, Jordan

Session 2D

Tuesday Morning II May 23

Room 103A

Electrical Properties of Materials

Chairman: Dr. John Emerson, Sandia National Laboratories, Albuquerque,
NM

9:30 a.m. Low Cost, High Thermal Conductivity Composites for Power
Electronics, W. Kowbel, K. Patel, W. Champion, J.C. Withers, MER
Corporation, Tucson, AZ; S. Choi, NASA Langley Research Center,
Hampton, VA

10:00 a.m. High Dielectric, Filled Polymers for Microwave
Applications, J.W. Schultz, Georgia Tech Research Institute, Atlanta,
GA; J.S. Colton, C.K. Berkowitz, Georgia Institute of

Technology/Mechanical Engineering, Atlanta, GA

10:30 a.m. Ductibility of Zr-Al-Cu-Ni Alloy Glass at Different Temperatures, H. Yabe, K. Takashina, K. Oguri, Y. Miyazawa, Y. Nishi, Tokai University/Material Science, Hiratsuka, Japan

11:00 a.m. High Resistance to Fracture of Carbon Fiber Irradiated by Sheet Electron Beam Irradiation, K. Oguri, T. Toriyama, M. Yabe, A. Honegawa, Y. Nishi, Tokai University/Materials Science, Hiratsuka, Japan

11:30 a.m. Resistance to Hydrochloric Acid Corrosion of Al-Li Alloys, A. Kimura, T. Nakamura, K. Mori, T. Okada, Y. Nishi, Tokai University/Materials Science, Hiratsuka, Japan; K. Oguri, Tokai University/Physics, Hiratsuka, Japan

Session 2E

Tuesday Morning | May 23

Room 103C

9:30 a.m.

University Research-I

Chairman: Dr. Anthony Saliba, University of Dayton, Dayton, OH

9:00 a.m. Scratch Resistant Thin Films Produced by ISAM, B. Okerberg, Virginia Tech

9:30 a.m. Design and Feasibility of OSB Composite Road Panels, M.T. Echard, West Virginia University

10:00 a.m. Characterization of Alumina Fillers in Thermally Conductive Polymer Ceramic Composite Materials, C. Chappelle, University of Washington

10:30 a.m. UAV Truss-Core Sandwich Composite Wing, K.J. Ford, West Virginia University

11:00 a.m. Modeling the Influence of Reinforcement Architecture on Formability, B.J. Souter, University of Nottingham

SAMPE 2000 Luncheon

Tuesday Afternoon | May 23

Beacon Ballroom

Hyatt Regency Hotel

12:00 Noon

Session 3A

Tuesday Afternoon | May 23

Room 203B

Composites Durability-II

Chairmen: Jerry Bauer, The Aerospace Corporation, Los Angeles, CA and Dr. Lei Zhao, University of California/San Diego, La Jolla, CA

1:30 p.m. Critical Gaps in Durability Data for FRP Composites in Civil Infrastructure, V.M. Karbhari, University of California/San Diego/Structural Engineering, La Jolla, CA; J.W. Chin, National Institute of Standards and Technology/Building Materials, Gaithersburg, MD; D. Reynaud, Civil Engineering Research Foundation, Washington, DC

2:00 p.m. Molecular Weight Effects on the Viscoelastic Response of a Polyimide, L.M. Nicholson, K.S. Whitley, T.S. Gates, NASA Langley Research Center, Hampton, VA

2:30 p.m. Investigation of the Effects of Freeze-Thaw Exposure on Composites for Seismic Retrofit, S. Zhang, J. Rivera, V.M. Karbhari, University of California/San Diego/Structural Engineering, La Jolla, CA

3:00 p.m. Applications of X-Ray Analytical Microscope to Estimation of Environmental Characteristics for FRP-(2), T. Katayama, M. Ikeda, Koshisha University, Kyoto, Japan; Y. Hosokawa, Horiba Ltd, Kyoto, Japan; A. Ellis, Analytical Ltd/Oxford Instruments, Abingdon, U.K.

3:30 p.m. Characterization of Freeze-Thaw Damage Mechanisms in Composites for Civil Infrastructure, J. Haramis, R.E. Weyers, Virginia Tech/Civil Engineering, Blacksburg, VA; K.N.E. Verghese, J.J. Lesko, Virginia Tech/Materials Response Group, Blacksburg, VA

Session 3B

Tuesday Afternoon | May 23

Room 203A

Metallics, Ceramics and Nano- composites-II

Chairman: George C. Hansen, Metal Matrix Composites Corporation,
Midway, UT

2:30 p.m. Properties of Nickel Aluminide Foams, J.A.E. Bell, FiberNide
Ltd, Oakville, Canada; G.C. Hansen, Metal Matrix Composites
Corporation, Midway, UT

3:00 p.m. Thermal and Electrical Properties of Dense Cr₃C₂ Sintered
Body, S. Tanaka, N. Takashima, J-I. Matsushita, Tokai
University/Engineering, Hiratsuka, Japan; Y. Sawada, Tokyo Institute
of Polytechnics, Atsugi, Japan

3:30 p.m. Dielectric Properties of PZT Prepared by Two Sol-Gel
Methods, Y. Ishimoto, T. Nagao, J. Matsushita, Tokai
University/Applied Chemistry, Hiratsuka, Japan; I.R. Abothu, S.
Komarneni, National University of Singapore/Institute of Materials
Research & Engineering, Singapore

3:00 p.m. Laser Surface Alloying of Brass with NiCrSiB for Improving
Cavitation Erosion Resistance and Corrosion Resistance, K.F. Tam, F.T.
Cheng, Hong Kong Polytechnic University/Applied Physics, Hong Kong,
PRC; H.C. Man, Hong Kong Polytechnic Univ/Manufacturing Engineering,
Hong Kong, PRC

3:30 p.m. The Design of a CFRP Passive Damper, T. Tanimoto, Shonan
Institute of Technology/Materials Science & Ceramic Technology,
Fujisawa, Japan

Session 3C

Tuesday Afternoon | May 23

Room 103B

Carbon Fibers and Novel Carbon Applications-II

Chairmen: Keith Bowman, Air Force Research Laboratory, WPAFB, OH and
Kurt Peterson, B.F. Goodrich, Pueblo, CO

1:30 p.m. Processing and Properties of Graphite Foams, J.C. Withers, J.P. Patel, MER Corporation, Tucson, AZ

2:00 p.m. Low Cost Carbon-Based Composite Pistons, W. Kowbel, J. Webb, K. Patel, J.C. Withers, MER Corporation, Tucson, AZ

2:30 p.m. Oxidation Study of Bare and Protected Carbon-Carbon Composites for Accelerated Lifetime Testing, I. Golecki, L. Xue, Honeywell International/Research and Technology, Morristown, NJ; D.M. Dewar, A.F. Anderson, C.K. Duncan, J. van Horik, K. Fuentes, F. Rahman, Honeywell International/Engines and Systems, Torrance, CA; T. Walker, Honeywell International/Aircraft Landing Systems, South Bend, IN

3:00 p.m. New Method for Measuring the Densification Rate of Carbon-Carbon and other Composite Articles, I. Golecki, D. Narasimhan, Honeywell International/Research and Technology, Morristown, NJ

Session 3D

Tuesday Afternoon | May 23

Room 202A

Fiber Placement and Tape Placement

Chairmen: Dr. Margaret Roylance and Douglas T. Thomson, Foster-Miller Inc, Waltham, MA

(CLOSED PAPER)

1:30 p.m. Advanced Fiber Placement Spars: Challenges to Implementation, R.A. Kisch, Boeing Commercial Airplanes Group, Seattle, WA

2:00 p.m. Ultrasonic Tape Lamination for Net Thickness Composites Processing, D.T. Thomson, M.E. Roylance, Foster-Miller Inc, Waltham, MA

2:30 p.m. Fiber Placement Process Utilization Within the Worldwide Aerospace Industry, C.G. Grant, Cincinnati Machine/Composite Products, Cincinnati, OH

3:00 p.m. Thermal Edge-Effects Model for Automated Tape Placement of Thermoplastic Composites, R.C. Costen, NASA Langley Research Center, Hampton, VA

Session 3E

Tuesday Afternoon | May 23

Room 202B

RTM and Resin Infusion Technology-I

Chairmen: Alan M. Markus, The Boeing Company, Long Beach, CA and Tia Benson Tolle, Air Force Research Laboratory, WPAFB, OH

1:30 p.m. High Rate Three Dimensional Near Net Shape Resin Transfer Molding, G. Fowler, Raytheon Systems Company/Antenna/Nanometallics Technology Center, McKinney, TX

2:00 p.m. Real-Time Monitoring and In-Process Control for RTM Production, N.J. Schwendeman, Raytheon Electronic Systems/Antenna Nonmetallics Technology Center, McKinney, TX

2:30 p.m. The Effect of Ply Drop-Off Regions on Flow Propagation and Processing Parameters During the Resin Transfer Molding Process, J.M. Lawrence, S.G. Advani, University of Delaware, Center for Composite Materials, Newark, DE

3:00 p.m. Permeability and Resin Flow Measurements and Simulations in Composite Preforms, I.M. Daniel, M.K. Um, B.W. Childs, D.H. Kim, Northwestern University/Center for Intelligent Processing of Composites, Evanston, IL

3:30 p.m. Tackified SCRIMP for Aerospace Applications, C-H. Shih, Q. Liu, L.J. Lee, Ohio State University/Chemical Engineering, Columbus, OH

Session 3F

Tuesday Afternoon | May 23

Room 202C

Composite Joining Technology

Chairman: Dr. Rickard B. Heslehurst, Australian Defence Force Academy, Canberra, Australia and Michael J. Robinson, Boeing Structures Technology/Phantom Works, Huntington Beach, CA

1:30 p.m. Development and Application of an Advanced Thermal Transfer Adhesive, J. Browne, Btech Corporation, Brentwood, TN

2:00 p.m. Affect of Variations to a Co-Bonding Process on Bond Strength, P.K. Lathrop, Boeing Commercial Airplane Group, Seattle, WA

2:30 p.m. Rubber Modified Vinyl Ester Structural Adhesives, L.A. Harris, E. Burts, J.S. Riffle, Virginia Tech/Center for Adhesives and Sealant Science, Blacksburg, VA

3:00 p.m. Structural Adhesive Bonded Joint Review, D.M. Gleich, M.J. Mooren, A. Beukers, Delft University/Aerospace Engineering, Delft, The Netherlands

3:30 p.m. Tensile Strength of Single Bolted Joint Natural Based Composites, B.C. Tobias, Silliman University/Engineering, Dumaguete City, Philippines

Session 3G

Tuesday Afternoon | May 23

Room 103C

University Research-II

Chairman: Dr. Anthony Saliba, University of Dayton, Dayton, OH

1:00 p.m. A Study of the Use of QE-7 Aluminum Alloy Molds on Heat Transfer Rate and Sink Marks in Plastic Injection Molding, N.V. Iyer, Purdue University

1:30 p.m. Prediction of Oncoming Crack Instability Through a Nondestructive Technique, J. Schroeder, Univ of Dayton

2:00 p.m. Characterization of Ballistic Impact Damage on Fatigue Crack Initiation in Ti-6Al-4V Simulated Engine Blades, C. Martinez, Univ of Dayton

2:30 p.m. Fabrication of a Polymer Matrix Functionally Gradient Material by Centrifugation, M. Koizumi, Shonan Institute of Technology

3:00 p.m. Time Dependent Circumferential Deformation of Bone Specimens Subjected to Internal Radial Loading, C. Brown, West Virginia University

3:30 p.m. Effects of Processing Parameters on the Microstructure of

Mechanically Alloyed Polymer-Polymer Micro-Composites, J. Martin,
Virginia Tech

1:00 p.m. Impact Response of GFRP Plates as Measured by Combined Hi-Speed DAQ Techniques, E. Cepus, University of British Columbia

1:30 p.m. Development of Polyaniline-Polypyrrole Composite Coatings on Steel by Aqueous Electrochemical Process, R. Rajagopalan, University of Cincinnati

Panel

Tuesday Afternoon | May 23

Room 201B

1:30 - 3:30 p.m.

Oral Presentations Only

Pushing the Envelope: Federal Needs in Low Cost Manufacturing of Composite Materials

Sponsored by the NIST Federal Working Group on Composite Materials

Moderator: Joannie Chen, NIST/Building Materials Division,
Gaithersburg, MD

A panel consisting of representatives from Federal agencies who are involved with implementing fiber-reinforced polymer (FRP) composites in their respective applications will present and discuss needs for FRP composite materials that can be produced at the lowest possible cost. The panel will be made up of FRP experts from the military, transportation and civil infrastructure arenas of the Federal government. A select number of producers and fabricators will also provide their point of view on the economics of producing FRP composites. Cost-related obstacles to the implementation of FRP composites will be highlighted.

An open discussion between panelists and attendees will follow the presentations by the panel members. Anticipated topics of discussion include:

Definition of "low cost," differences in the perception of cost between applications

Emerging technologies in fiber manufacture, resin raw materials

and processing with potential for driving costs down

Cost/performance trade-offs

What is the customer willing to pay to achieve a targeted performance

Supply and demand concerns

Anticipated growth/projected volume for FRP materials

Life cycle versus initial costs

NIIST Task Force

Meeting

Tuesday Afternoon | May 23

3:30 - 5:00 p.m.

Room 201B

Forum

Tuesday Afternoon | May 22

Room 201A

Oral Presentations Only

Advanced Polymers for Space Applications-II

Sponsored by AFOSR

Materials Development and Applications

Chairman: Dr. Russell Lipeles, The Aerospace Corporation, Los Angeles, CA

3:30 p.m. Recent Developments in Polymeric Materials for Space Applications at the NASA Langley Research Center, Dr. John W. Connell, NASA Langley Research Center, Hampton, VA

5:00 p.m. Critical Issues in Fabrication, Design, and Testing of Composite Cryotanks, Tia Benson Tolle, Dr. Janis M. Brown, Air Force

SAMPE 2000 Final Program

Research Laboratory, WPAFB, OH; and Norman J. Johnston, NASA Langley Research Center, Hampton, VA

2:30 p.m. Multi-Functional Hybrid Inorganic/Organic Polymers for Space Applications, Shawn H. Phillips, Rene I. Gonzalez, Edwards Air Force Research Laboratory, Edwards AFB, CA and Gar B. Hoflund, Univ of Florida, Chemical Engineering Department, Gainesville, FL

3:00 p.m. Break

3:15 p.m. Electroactive Gels for Adaptive Optics, Patrick T. Mather, Seung B. Chun, University of Connecticut, Institute of Materials Science and Chemical Engineering Department, Storrs, CT and Patrick J. Hood, Cornerstone Research Group, Dayton, OH

3:45 p.m. Vapor Grown Carbon Fiber/Organic Matrix Composites: General Principles and Application to Erosion Resistant Rocket Nozzle Materials, Charles U. Pittman Jr, Lichang Wang, Mississippi State University, Chemistry Department and Richard D. Patton, Mississippi State University, Mechanical Engineering, Mississippi State, MS

Forum

Wednesday Morning 1 May 24

8:00 - 10:00 a.m.

Room 201B

Oral Presentations Only

NASA R&D Partnership Opportunities and NASA Needs

Coordinator: Charles D. Taylor, Business Development, Mid-Atlantic Technology Applications Center, Pittsburgh, PA

Open to all badged attendees

Technology Opportunities

NASA has undertaken sweeping changes in its technology program management. These changes will influence how the agency identifies new technology investments, defines new mission opportunities, and ensures the efficient transition of new technologies into mission programs.

At the same time, NASA is aiming to broaden its technology commercialization efforts. In order to meet its goals, NASA is looking

to form collaborative R&D partnerships for co-funded technology development projects. Such partnerships will enable NASA to access industry expertise to accelerate technology development and reduce mission costs. Industry will benefit from NASA technology expertise, reduce its R&D costs and improve its competitive position with innovative products.

NASA Technology Needs

In this forum, NASA officials will discuss their goals for the Materials Sector Initiative, the plan to communicate NASA's future needs to SAMPE members and develop dual-use technology partnerships with U.S. companies.

Discussions will outline NASA's anticipated materials needs, describe real-life company experiences and tell companies how to work with NASA.

Panel Participants:

NASA Goals for Joint Development Partnerships, Dr. Robert Norwood, Director, NASA Commercial Technology Program

Aero-Space Enterprise's Advanced Materials Needs, Dr. Charles E. Harris, NASA Structures and Materials Center of Excellence

Needs for Advanced Materials for Future Space Science Missions, Dr. Peter Ulrich, Technology Director, Space Science Enterprise

How to Work with NASA, Preston I. Carroway, Deputy Director Technology Commercialization Program Office

A discussion period will welcome questions and comments from the attendees. Follow-on meetings with interested parties will be arranged.

Session 4A

Wednesday Morning | May 24

Room 103A

Civil/Infrastructure Composites Applications-I

Chairmen: Dr. Ayman Mosallam, California State University/Engineering,

Fullerton, CA and M. Haroun, University of California, Irvine, CA

8:00 a.m. Cured-in-Place Composite Pipe Structures in Infrastructure Rehabilitation, F.A. Hoffstadt, Insituform Technologies Inc, Chesterfield, MO

8:30 a.m. Structural Upgrade and Repair of Wood Members Using Cross-Ply Carbon/Epoxy, A. Mosallam, J. Kreiner, California State University/Engineering, Fullerton, CA; K. Gillette, Edge Structural Composites, Richmond, CA

9:00 a.m. Experimental Numerical Investigations on the Behavior of Pultruded Composite Interior Joints, A.S. Mosallam, California State University/Engineering, Fullerton, CA

9:30 a.m. Shear Strengthening of Reinforced Concrete with CFRP, C. Szaderski, EMPA/Swiss Federal Laboratories for Materials Testing and Research, Dübendorf, Switzerland

10:00 a.m. FRP-Wood Nailed Joint Behavior, J.P. Judd, F.S. Fonseca, Brigham Young University/Civil Engineering, Provo, UT

10:30 a.m. Processing Friendly and Durable Thermoplastic Sizings for Carbon Fiber/Vinyl Ester Pultruded Composites, K.N.E. Verghese, N.S. Broyles, J.J. Lesko, R.M. Davis, J.S. Riffle, Virginia Tech/Designed Interphase Group, Blacksburg, VA

11:00 a.m. Development of a Life Prediction Methodology for Hybrid FRP Beams for Deck/Girder Bridges, J.L. Senne, J.J. Lesko, S.W. Case, Virginia Tech/Engineering Science & Mechanics, Blacksburg, VA; T. Cousins, Virginia Tech/Civil and Environmental Engineering, Blacksburg, VA

Session 4B

Wednesday Morning | May 24

Room 103B

Closed Mold Processing

Chairman: Richard Dropek, Composite Professionals, Inc., Sandy, UT

8:00 a.m. Low Cost Manufacturing for Composite Control Surfaces, R.J. Gardiner, Radius Engineering, Salt Lake City, UT; J.W. Laffen, Laytheon Aircraft, Wichita, KS

8:30 a.m. Near Net Shaped Preforms for Molded Components, J. Goering, Albany International Techniweave Inc, Rochester, NH

9:00 a.m. Effects of Preform Architecture on Racetracking in Liquid Molding, J. Chaneske, K. Jayaraman, Michigan State University/Chemical Engineering, Lansing, MI; D. Norman, R. Robertson, University of Michigan/Materials Science and Engineering, Ann Arbor, MI

9:30 a.m. Evaluation of Hand Lay-Up and Resin Transfer Molding in Composite Wind Turbine Blade Structures, D.S. Cairns, J.D. Skramstad, Montana State University/Mechanical and Industrial Engineering, Bozeman, MT

10:00 a.m. Fabrication of Composite Sandwich Panels Fabricated Using Vacuum Assisted Resin Transfer Molding, S.A. Smith, L.L. Emmanwori, R.L. Sadler, K.N. Shivakumar, North Carolina A&T State University/Center for Composite Materials Research, Greensboro, NC

10:30 a.m. Resin Transfer Molding of the ITER CS Model Coil, P.N. Clark, Radius Engineering Inc, Salt Lake City, UT; R.P. Reed, Cryogenic Materials Inc, Boulder, CO

11:00 a.m. Resin Transfer Molding Based Carbon/Carbon Composites, F. Abali, K. Shivakumar, R. Sadler, North Carolina A&T State University/Center for Composite Materials Research, Greensboro, NC

Session 4C

Wednesday Morning 8 May 24

Room 103C

Resin Technology

Chairman: Dr. Donald Klosterman, University of Dayton Research Institute, Dayton, OH

8:00 a.m. Degree of Cure, Heat of Reaction and Viscosity of 8552 and 977-3 HM Epoxy Resin, S.J. Ng, R. Boswell, S.J. Claus, F. Arnold, Naval Air Warfare Center/Polymers and Composites, Patuxent River, MD; A. Vizzini, University of Maryland/Aerospace Engineering, College Park, MD

8:30 a.m. Investigation of Manufacturing Effects on the Cured Thermal Properties of a Wet Lay-Up Thermoset Resin, M.S. Tillman, J.C.

Seferis, University of Washington/Chemical Engineering, Seattle, WA

9:00 a.m. A Mathematical Model for Optimal Control of Cure Distribution in Parts Made by Laminated Object Fabrication (LOF), L. Flach, E. Bryant, D. Klosterman, R. Chartoff, University of Dayton Research Institute/Rapid Prototype Development Laboratory, Dayton, OH

9:30 a.m. Tg Response to Cure Schedule Variations: Phenylethynyl-Terminated UltemT Composites, T.A. Bullions, M.P. Stoykovich, A.C. Loos, Virginia Tech/Engineering Science and Mechanics, Blacksburg, VA; J.E. McGrath, Virginia Tech/Chemistry, Blacksburg, VA

10:00 a.m. Automated Exotherm Control for Thick Composite Processing, B.P. Rice, C.W. Lee, University of Dayton Research Institute, Dayton, OH; P. Jouin, The Boeing Company, Mesa, AZ

10:30 a.m. Processing with Cyclic PBT to Produce Thermoplastic Composites, J.P. Ciovacco, Cyclics Corporation, Rensselaer, NY; S.J. Winckler, Global Composites Inc, Clifton Park, NY

11:00 a.m. Life Cycle Cost Modeling of Continuous Fibre Reinforced Thermoplastics, A. Hartmann, M. Neitzel, P. Mitschang, Kaiserslautern University/Institut fuer Verbundwerkstoffe GmbH, Kaiserslautern, Germany

Session 4D

Wednesday Morning | May 24

Room 202C

Testing and Characterization-I

Chairmen: Dr. Donald Adams, Wyoming Test Fixtures Inc, Laramie, WY and Dr. Daniel Adams, University of Utah, Mechanical Engineering, Salt Lake City, UT

8:00 a.m. A Comparison of Open-Hole Compression Fixtures by Experimental Evaluation, S.L. Coguill, D.F. Adams, University of Wyoming/Composite Materials Research Group, Laramie, WY

8:30 a.m. Tabbed Axial Tensile Specimen Configurations for Indirectional Composites, R.J. Coguill, D.F. Adams, University of Wyoming/Composite Materials Research Group, Laramie, WY

9:00 a.m. A Test Method for Assessing Interfacial Shear Strength in Composites, G.A. Holmes, D.L. Hunston, W.G. McDonough, R.C. Peterson, National Institute of Standards & Technology/Polymer Composites, Gaithersburg, MD

9:30 a.m. Tensile Strain Capacity of Geopolymers by Cantilever Beam Method, J.A. Hammell, P.N. Balaguru, Rutgers the State University/Civil Engineering, Piscataway, NJ; R.E. Lyon, Federal Aviation Administration/Fire Safety Section, Atlantic City International Airport, NJ

10:00 a.m. Tensile Strength of Fibre-Polymer Interfaces, M.R. Piggott, M.A. Alimuddin, M. Chan, A. Zhang, J. Sun, University of Toronto/Advanced Composites Physics and Chemistry, Toronto, Canada

10:30 a.m. An Alternate Compression Test Method for Notched and Unnotched Composites, J.D. Bardis, K.T. Kedward, University of California/Mechanical and Environmental Engineering, Santa Barbara, CA; J.O. Bish, Friedman Research Corporation, Santa Barbara, CA; T.K. Tsotsis, The Boeing Company, Long Beach, CA

11:00 a.m. Surface Morphology of Thermosets, C. Serre, M. Vayer, R. Erre, Universite d'Orleans/CNRS/Centre de Recherche sur la Matiere, Orleans, France

11:30 a.m. Effect of Water Exposure Cycles on Physical Properties of a Particle-Filled, Epoxy-Based Adhesive, M.Y.M. Chiang, M. Fernandez-Garcia, National Institute of Standards and Technology/Polymers, Gaithersburg, MD; E.M. Yorkgitis, 3M Company, St Paul, MN

Session 4E

Wednesday Morning 11 May 24

Room 203A

Fire Safe Materials-I

Sponsored by IWGFM

Chairmen: Usman Sorathia, Naval Surface Warfare Center/Carderock, West Bethesda, MD and Richard E. Lyon, FAA/Fire Safety Section, Atlantic City International Airport, NJ

9:00 a.m. Characterization of the Flammability of Polymers by High

Energy Flux (HEF) Calorimeter, W. Chin, R. Shuford, U.S. Army Research Laboratory/Weapons and Materials Research Directorate, Aberdeen Proving Ground, MD; A. Tewarson, Factory Mutual Research Corporation, Norwood, MA

9:30 a.m. Fire Safety of Marine Composites, U. Sorathia, T. Gracik, J. Jess, M. Blum, A. Le, B. Scholl, G. Long, Naval Surface Warfare Center/Carderock, West Bethesda, MD; B. Lattimer, Hughes Associates Inc, Baltimore, MD

9:00 a.m. Fire Hardened Composites for Improved Safety, A. Mekjian, Mektech Composites Inc, Hillsdale, NJ

9:30 a.m. Toughening and Cure Optimization of Fire Resistant Biophenol Based Bisphthalonitrile, M. Sankarapandian, T.E. Glass, J.E. McGrath, Virginia Tech/Chemistry, Blacksburg, VA; P. Mack, M. Smith, P. Blatkowski, J. Conroy, J. Piche, Eikos Inc, Franklin, MA

10:00 a.m. Fire-Hardened Composites for Shipboard Structures, D.D. Coppens, D. Rabeno, Anholt Technologies Inc, Avondale, PA; J.W. Gillespie Jr, University of Delaware/Center For Composite Materials, Newark, DE; R. Crane, Naval Surface Warfare Center/Carderock, West Bethesda, MD

10:30 a.m. Estimating Fire Growth on Composite Materials in a Corner Configuration, T.J. Ohlemiller, National Institute of Standards and Technology/Building and Fire Research Laboratory, Gaithersburg, MD

11:00 a.m. Novel Flame Retardant Polymer Blends, J.L. Jurs, E.T. Mickelson, D.B. Abramowitz, J.M. Tour, Rice University/Center for Nanoscale Science and Technology, Houston, TX

Session 5A

Wednesday Afternoon ▯ May 24

Room 103B

Advanced NDE and Smart

Structures-I

Chairmen: Francesco Lanza di Scalea, University of California/San Diego/Structural Engineering, La Jolla, CA and Tigmur Akgul, Tusas Aerospace, Turkey

1:00 p.m. Nondestructive Testing of Commercial Airplane Composite Wing Tip Components, M.L. Little, The Boeing Company, Seattle, WA

1:30 p.m. F/A-18C/D and E/F Implementation of Dielectric Sensor Adhesive Staging, J.M. Griffith, T. Hackett, The Boeing Company, St Louis, MO

2:00 p.m. Quantitative Infrared Defect Detection in Composite Aerospace Structures, S. Shepard, Thermal Wave Imaging Inc, Ferndale, MI; R.J. Ducar, Nordam Nacelle and Thrust Reverser Division, Tulsa, OK

2:30 p.m. Low-Frequency Ultrasonic Imaging of Composite Structures with Squirter-Based Water-Coupled and Air-Coupled Transducers, D.J. Lotter, T.E. Michaels, J.E. Michaels, D. Kass, M.E. Stanton, I.V. Kosenko, F.H.C. Hotchkiss, Panametrics Inc, Waltham, PA

3:00 p.m. Portable Sensor for Non-Invasive Prepreg Assessment, P.J. Prado, E. Magnuson, Quantum Magnetics Inc, San Diego, CA; S. Menon, Menon & Associates Inc, San Diego, CA

3:30 p.m. Progress and Challenges to NDE of Composites Using Obliquely Propagating Ultrasonic Waves, Y. Bar-Cohen, S-S. Lih, Jet Propulsion Laboratory/Caltech, Pasadena, CA

Session 5B

Wednesday Afternoon | May 24

Room 103C

Composites Design and Analysis

Chairmen: Prof. Douglas Cairns, Montana State University, Bozeman, MT and James Patterson, Hypercomp Engineering Inc, Brigham City, UT

1:00 p.m. Balsa Wood Core Material Design Values, C. Kilbourn, Diab Inc, DeSoto, TX

1:30 p.m. Robust Design Optimization of Composite Structures, E.J. Barbero, S. Makkapati, West Virginia University/Mechanical and Aerospace Engineering, Morgantown, WV

2:00 p.m. Advances in Low Temperature Curing Prepregs for Aerospace Structures, C. Ridgard, Advanced Composites Group Inc, Tulsa, OK

2:30 p.m. Approximate Finite-Width Stress for Concentration Solutions, R-E. Harn, University of Texas/Arlington, Dallas, TX

3:00 p.m. Computational Simulation of Aerospace Structures Fatigue-Life, C.C. Chamis, NASA Glenn Research Center, Cleveland, OH; L. Minnetyan, Clarkson, University, Potsdam, NY

3:30 p.m. Analytical Model Prediction of Strain Measured by Fiber Optic Sensors Embedded in Composites, D. Rea, W.J. Flis, R. Foedinger, DE Technologies Inc, King of Prussia, PA; T.L. Vandiver, U.S. Army Aviation and Missile Command, Redstone Arsenal, AL

Session 5C

Wednesday Afternoon | May 24

Room 103A

Filament Winding and Pultrusion

Chairman: John Green, Entec Composite Machines Company, Salt Lake City, UT

1:00 p.m. The Pulling Force Mechanism and Its Influence on Injection Pultrusion, S. Li, Z. Ding, M. Li, L.J. Lee, Ohio State University, Columbus, OH; H. Engelen, M. Puckett, The Dow Chemical Company, Freeport, TX

1:30 p.m. Tensile Behavior of Filament-Wound Glass Reinforced Elastomeric Tubes, C.E. Bakis, M.W. Orlet, Pennsylvania State University/Engineering Science & Mechanics, University Park, PA

2:00 p.m. On-Line Tow Width Measurement in Filament Winding, M. Koehmieder, W. Michaeli, Institut of Plastics Processing (IKV)/RTTH, Aachen, Germany

2:30 p.m. The Performance Improvement of Filament Wound Composite Pressure Vessels, T.K. Hwang, S.K. Jung, Y.D. Doh, W.M. Cho, B. Jung, Agency for Defense Development, Taejon, South Korea

3:00 p.m. Improved Composite FOG-M Missile Bobbin, T.J. Carroll, J.P. Panucci, J.J. Gorman, KaZaK Composites Inc, Woburn, MA

3:30 p.m. Automated Filament Winding of Large, Complex Shapes, J.L. Gilchrist, Smith Fiberglass Products, Little Rock, AR

4:00 p.m. Selective Interval PulshapingT-Introducing Variable Cross-Section Geometry Features to Thermoset Pultruded Products, J.E.

Sumerak, P.H. Hartman, Creative Pultrusions Inc/Pultrusion Dynamics,
Oakwood Village, OH

Session 5D

Wednesday Afternoon | May 24

Room 203B

Qualification and Standardization

Chairmen: Miraflor C. Jacobs, The Boeing Company, Arcadia, CA and
Russell Maguire, Boeing Materials Technology, Seattle, WA

1:00 p.m. Composite Materials and Processes Qualification Protocol,
J.J. Banisaukas, BP Amoco, Alpharetta, GA; G. Hahn, S. Wanthal, The
Boeing Company, St Louis, MO

1:30 p.m. Reduced Quality Assurance Testing of Commercial Aircraft
Prepreg Systems, R.W. Hillermeier, K. Chung, J.C. Seferis, University
of Washington/Polymeric Composites Laboratory, Seattle, WA; M.H. Diaz,
Hexcel Structures, Kent, WA

2:00 p.m. Standardization of Phase Separation in Rubber Toughened
Epoxy Matrices: Discontinuous Phase Functionality, E.N. Gilbert, B.S.
Hayes, J.C. Seferis, University of Washington/Polymeric Composites
Laboratory, Seattle, WA

2:30 p.m. Standardization of Advanced Composite Materials, J.
Banisaukas, BP Amoco, Alpharetta, GA; G. Hansen, Composites Made Easy,
Salt Lake City, UT

3:00 p.m. Towards Standardization for Through-Thickness Reinforcement
of Laminates, B.N. Cox, Rockwell Science Center, Thousand Oaks, CA; R.
Massabo, University of Genova/Structural and Geotechnical Engineering,
Genova, Italy

3:30 p.m. Common Boeing Quality Management System, M.C. Jacobs, G.
Baker, Boeing Commercial Airplanes Group/Procurement Quality
Assurance, Arcadia, CA

Session 5E

Wednesday Afternoon | May 24

Room 202B

RTM and Resin Infusion

Technology-II

Chairmen: Tia Benson Tolle, Air Force Research Laboratory, WPAFB, OH
and Alan M. Markus, The Boeing Company, Long Beach, CA

1:00 p.m. Double-Chamber Vacuum Resin Transfer Molding, K.K. Han, B.P.
Rice, C.W. Lee, University of Dayton Research Institute, Dayton, OH

1:30 p.m. Fabricating Carbon/Carbon Box Elements Using the Resin
Transfer Molding Process, B. Amponsah, R.L. Sadler, F. Abali, K.
Shivakumar, North Carolina A&T State University/Center for Composite
Materials Research, Greensboro, NC

2:00 p.m. Automation and Control of Large-Scale Composite Parts by
VARTM Processing, D. Heider, C. Hoffman J.W. Gillespie Jr, University
of Delaware/Center for Composite Materials, Newark, DE

2:30 p.m. Approach Towards an Automated Design Environment for the
Resin Transfer Molding Process, H.C. Stadtfeld, E.M. Sozer, K.V.
Steiner, S.G. Advani, University of Delaware/Center for Composite
Materials, Newark, DE; S. Kolavennu, S. Parthasarathy, Honeywell
Technology Center, Minneapolis, MN

3:00 p.m. High Temperature Transfer Molding Resins, J.G. Smith Jr,
J.W. Connell, P.M. Hergenrother, NASA Langley Research Center,
Hampton, VA; J.M. Criss, Lockheed Martin Aeronautical Systems,
Marietta, GA

3:30 p.m. A New Kinetic Model for Degree of Cure and Viscosity in
Liquid Molding Application, M-K. Um, Korea Institute of Machinery and
Materials/Composite Materials Laboratory, Changwon, South Korea; I.M.
Daniel, Northwestern University/Center for Intelligent Processing of
Composites, Evanston, IL

Session 5F

Wednesday Afternoon || May 24

Room 202C

Testing and Characterization-II

Chairmen: Dr. Donald Adams, Wyoming Test Fixtures Inc, Laramie, WY and
Dr. Daniel Adams, University of Utah/Mechanical Engineering, Salt Lake
City, UT

1:00 p.m. Determination of Relaxation Modulus of Polymers and Composites, Y.K. Kim, I.M. Daniel, Northwestern University/Center for Intelligent Processing for Composites, Evanston, IL

1:30 p.m. Effects of CO₂ Saturation on the Tensile and Impact Properties of Polycarbonate, P.J. Wallingford, B.D. Flinn, University of Washington/Materials Science and Engineering, Seattle, WA; V. Kumar, University of Washington/Mechanical Engineering, Seattle, WA

2:00 p.m. Filament Interaction During Failure in Bundles Under Tension, T.S. Creasy, University of Southern California/Center for Composite Materials, Los Angeles, CA

2:30 p.m. Mechanical Property Evaluation of Stitched Composite Sandwich Panels, L.E. Stanley, S.S. Gharpure, D.O. Adams, University of Utah/Mechanical Engineering, Salt Lake City, UT

3:00 p.m. Effects of Resin on Real-Time Static Strain Testing of Composite Sporting Goods, T. Takatoya, E.N. Gilbert, B.S. Hayes, J.C. Seferis, University of Washington/Polymeric Composites Laboratory, Seattle, WA; W.B. Tytus, Pocock Racing Shells, Everett, WA

3:30 p.m. EMAT-Generated Shear Waves as a Probe for Composite Laminate Layup Errors, D.K. Hsu, D. Fei, Iowa State University/Center for Nondestructive Evaluation, Ames, IA

Session 5G

Wednesday Afternoon □ May 24

Room 203A

Fire Safe Materials-II

Sponsored by IWGFM

Chairmen: Usman Sorathia, Naval Surface Warfare Center/Carderock, West Bethesda, MD, Robert Friedman, NASA Glenn Research Center, Cincinnati, OH and Louis Nash, U.S. Coast Guard R & D Center, Groton, CT

1:00 p.m. Testing and Selection of Fire-Resistant Materials for Spacecraft Use, R. Friedman, B. Jackson, S. Olson, NASA Glenn Research Center, Cleveland, OH

1:30 p.m. Characterization of Carbonized Wood Core for Use in FRP Sandwich Ship Structures, P.D. Wienhold, A.M. Lennon, J.C. Roberts, M. Rooney, The Johns Hopkins University/Applied Physics Laboratory,

laurel, MD; A.K. Kercher, D.C. Nagle, The Johns Hopkins University/Center for Nondestructive Evaluation, Baltimore, MD; U. Sorathia, Naval Surface Warfare Center/Carderock, West Bethesda, MD

1:00 p.m. Flammability of Aircraft Thermal Insulation Films, S. Sandhi, Galaxy Scientific Corp, Egg Harbor Township, NJ; J.G. Quintiere, University of Maryland/Fire Protection Engineering, College Park, MD; R.E. Lyon, Federal Aviation Administration/Fire Safety Section, Atlantic City International Airport, NJ

1:30 p.m. Thermal Analysis of Polymer Flammability, R.E. Lyon, Federal Aviation Administration/Fire Safety Section, Atlantic City International Airport, NJ; R.N. Walters, Galaxy Scientific Corporation, Egg Harbor Township, NJ

2:00 p.m. Tough, Void-Free Flame Retardant Phenolic Networks: Processability and Properties, S.L. Lin, M. Rutnakornpituk, C.S. Tyberg, J.S. Riffle, Virginia Tech/Center for High Performance Polymeric Adhesives and Composites, Blacksburg, VA; U. Sorathia, Naval Surface Warfare Center/Carderock, West Bethesda, MD

2:30 p.m. A Novel Low Cost Fire Resistant Composite Resin for VARTM, E.C. Young, G. Rossi, J.D. Lennhoff, M. Vinciguerra, Triton Systems Inc, Chelmsford, MA; U. Sorathia, Naval Surface Warfare/Carderock, West Bethesda, MD

WGFM Business

Meeting

Wednesday Afternoon | May 24

Room 203A, 4:00 p.m.

Speaker: Mr. Gus Sarkos, FAA

"Development of Improved Fire Test Criteria for Aircraft Thermal Acoustical Insulation and Status of Related FAA Rule Making"

Fellow Banquet

Wednesday Evening | May 24

Beacon Ballroom

Hyatt Regency Hotel

7:00 p.m.

Tutorials

Thursday Morning | May 25

3:00 a.m., Room 102A

Test Methods for Composite Materials, Dr. Donald F. Adams, Wyoming
Test Fixtures and University of Wyoming, Laramie, WY

3:00 a.m., Room 101B

Practical Design with Composite Materials: Case Histories and
Examples, W. Brandt Goldsworthy and Dr. Clem C. Hiel, W. Brandt
Goldsworthy & Associates, Torrance, CA

Session 6A

Thursday Morning | May 25

Room 103B

Advanced NDE and Smart

Structures-II

Chairmen: Charles Buynak, Air Force Research Laboratory, WPAFB, OH and
Francesco Lanza diScalea, University of California/San
Diego/Structural Engineering, La Jolla, CA

3:00 a.m. In-Service NDE of Composites via the NQR Strain Gauge, S.A.
Vierkotter, Quantum Magnetics Inc, San Diego, CA

3:30 a.m. Non-Contact Ultrasonic Inspection of Railroad Tracks, F.
Lanza diScalea, University of California/San Diego/Structural
Engineering, La Jolla, CA; S. Kenderian, R.E. Green Jr, The Johns
Hopkins University/Materials Science & Engineering, Baltimore, MD

3:00 a.m. Investigation of Embedded Radio Frequency Sensors in
Composite Structures, J.F. Lindsey III, D.T. Williams, Southern
Illinois University/Technology, Carbondale, IL

9:30 a.m. Quality Assurance for Composite Bonding, R.H. Bossi, R.L. Jerenberg, Boeing Phantom Works, Seattle, WA

Session 6B

Thursday Morning | May 25

Room 103A

Civil/Infrastructure Composites Applications-II

Chairmen: Prof. David Jensen, Brigham Young University, Provo, UT and Dr. Jesa Kreiner, California State University, Fullerton, CA

9:00 a.m. Experimental Study on RC Bridge Columns Retrofitted Using Fiber Composite Materials, M.N. Youssef, M. Haroun, M. Feng, University of California, Irvine, CA; A. Mosallam, California State University, Fullerton, CA

9:30 a.m. Repair and Upgraded of R/C Two-Way Slab with Carbon/Epoxy Laminates, A.S. Mosallam, California State University, Fullerton, CA; M. Haroun, H. Elsanadedy, University of California, Irvine, CA; K. Gillette, Edge Structural Composites, Richmond, CA

9:00 a.m. Cyclic Performance of Reinforced Concrete Beam-Column Connections Repaired and Upgraded with Carbon/Epoxy Laminates, A.S. Mosallam, California State University, Fullerton, CA; H.M. Elsanadedy, University of California, Irvine, CA

9:30 a.m. Proposed Qualification Criteria for FRP Systems for Infrastructure Applications, G.J. Blaszak, BG International, Baltimore, MD; W.J. Gold, Engineering Consultant, Baltimore, MD; H.S. Kliger, HSK Associates, Edison, NJ

10:00 a.m. Mechanics of Recycled Polymeric Composites, A.F. Avila, Universidade Federal de Minas Gerais/Mechanical Engineering, Belo Horizonte, Brazil

Session 6C

Thursday Morning | May 25

Room 202B

F-Beam/Microwave Processing-I

Chairmen: Dr. Daniel Goodman, Science Research Laboratory, Somerville,

Dr. G.R. Palmese, University of Delaware/Center for Composite Materials, Newark, DE

8:00 a.m. Scintillator-Based Fiber Optic Dosimeters for Electron Beam Processing, A.E. Hoyt, J-M. Gosau, L.A. Harrah, R.E. Allred, Adherent Technologies Inc, Albuquerque, NM

8:30 a.m. Investigation of Factors Influencing the Cationic Polymerization of Epoxy Resins, G.R. Palmese, N.N. Ghosh, Univ of Delaware/Center for Composite Materials, Newark, DE; S.H. McKnight, U.S. Army Research Laboratories/Weapons and Materials Research Directorate, Aberdeen Proving Ground, MD

9:00 a.m. A Method for Specifying Consistent Radiation for the Processing of Electron Beam Cured Composites, M.S. Wilenski, Boeing Phantom Works, Seattle, WA; C. Eberle, Oak Ridge National Laboratory, Oak Ridge, TN; S. Korenev, Steris Isomedix, Vernon Hill, IL; V. Lopata, Acsion Industries, Manitoba, Canada; M. Stern, E-Beam Services, Cranbury, NJ

9:30 a.m. Simulation of Energy Deposition in E-Beam Irradiated Polymers, P. Horny, R. Gauvin, H. Demers, Universite de Sherbrooke/Genie Mecanique, Sherbrooke, Canada; P. Hovington, Institut de Recherche d'Hydro Quebec, Varennes, Canada; S. Besner, Laboratoire des Technologies Electrochimiques et Electrotechnologiques d'Hydro Quebec, Shawinigan, Canada

Session 6D

Thursday Morning | May 25

Room 202C

(CLOSED SESSION)

Aircraft Applications-I

Chairman: Darwin Moon, The Boeing Company, Long Beach, CA

8:00 a.m. Reinforcement Concepts for Local Joints in Composite Aircraft Structures, D.G. Moon, The Boeing Company, Long Beach, CA

8:30 a.m. A Review of the Stitched Composite Technology and its Damage Tolerance Performance, W. Keith, The Boeing Company, Long Beach, CA

9:00 a.m. Correlation of Neat Resin and Composite Compressive Properties, T.K. Tsotsis, The Boeing Company, Long Beach, CA

9:30 a.m. Evaluation of Stitching Thread Materials for Use in Stitched/RFI Process, T.K. Tsotsis, R. Turley, The Boeing Company, Long Beach, CA; S. Wanthal, The Boeing Company, St Louis, MO; C. Blair, S. Gennrich, Bryte Technologies, Morgan Hill, CA; K. Rugg, S. Narayanaswamy, B. Cox, Rockwell Science Center, Thousand Oaks, CA

Session 6E

Thursday Morning 1 May 25

Room 203A

Space Technology and Applications-I

Chairmen: Susan Ruth, The Aerospace Corporation, Los Angeles, CA and Dr. Charles Y-C. Lee, Air Force Office of Scientific Research, Arlington, VA

8:00 a.m. Space Environmentally Stable Polyimides and Copolyimides, K.A. Watson, J.W. Connell, NASA Langley Research Center, Hampton, VA

8:30 a.m. Remarkable AO Resistance of POSS Inorganic/Organic Polymers, S.H. Phillips, R.I. Gonzalez, K.P. Chaffee, T.S. Haddad, Edwards A.F. Research Laboratory, Edwards AFB, CA; G.B. Hoflund, University of Florida/Chemical Engineering, Gainesville, FL; B.S. Hsiao, B.X. Fu, State University of New York at Stony Brook/Chemistry, Stony Brook, NY

9:00 a.m. Thermal Management Solutions Utilizing High Thermal Conductivity Graphite Foams, J. Klett, Oak Ridge National Laboratory/Carbon and Insulation Materials Technology, Oak Ridge, TN; B. Conway, Performance Research Inc, Denver, NC

9:30 a.m. Graphite Faceskin Deployable Radiator Panels for Space Satellites, T. Ozaki, A. Yao, Y. Ohkawa, H. Seko, Mitsubishi Electric Company, Sagamihara, Japan; A. Tsujihata, H. Noda, National Space Development Agency, Japan

10:00 a.m. Development of Integrated Moulding Divergent Section of Thin Wall Nozzle Case, Y. Ling, J. Jianguo, S. Dafeng, Z. Husheng, Shanghai Xin Li Power Equipment Institute, Shanghai, PRC

Session 6F

Thursday Morning 1 May 25

Room 203B

Automotive and Industrial

Applications-I

Chairmen: Robert Murdock, Hydrospin, Huntington Beach, CA and Lawrence P. Bazinet, Fortafil Fibers, Ramona, CA

8:00 a.m. Design and Fabrication of Optimized Porous Structures Using Reflexive Materials Technology, C.R. Owens, W.E. Owens, UniStates Technology Company, Alexandria, VA; H.A. Bruck, University of Maryland, College Park, MD

8:30 a.m. Optimizing Friction Formulation Technique with Emphasis on Relational Grade Analysis, Y. Lu, M.A. Wright, Southern Illinois University/Center for Advanced Friction Studies, Carbondale, IL

9:00 a.m. Innovative Automotive Applications Based on Zentronr High Strength Glass Fiber, M.A. Kinsella, D. Murray, Advanced Glassfiber Fibers, Aiken, SC; C.G. Cofer, Owens Corning Corporation, Granville, OH; W. Clarke, The Gasket King Company, Irvine, CA

9:30 a.m. Nanocomposites for School Bus Upholstery, W. Kowbel, K. Patel, J.C. Withers, MER Corporation, Tucson, AZ

10:00 a.m. Viscoelastic Behavior of Composite Flywheels, R.P. Emerson, J.E. Bakis, Pennsylvania State University/Engineering Science and Mechanics, University Park, PA

10:30 a.m. Dendritic Polymers Used as Additive in Thermoset Composites, K. Olofsson, Swedish Institute of Composites, Pitea, Sweden; B. Pettersson, Perstorp Specialty Chemicals, Perstorp, Sweden

11:00 a.m. CNG Fuel Tank Systems for Maximum Taxi and Minivan Payload Space and Vehicle Range, J.B. Carrigan, N.J.H. Holroyd, Luxfer Gas Cylinders, Riverside, CA; L.W. Smith, E.E. Morris, Luxfer Gas Cylinders/Composite Cylinders, Riverside, CA

Session 7A

Thursday Afternoon | May 25

Room 103B

Process Control

Chairmen: Kim S. Niles, Delta Design Inc/Cohu Inc, San Diego, CA and
Dr. Phan Van An, National Center for Technical Progress of Vietnam,
Hanoi, Vietnam

1:00 p.m. In-Situ Measurement and Monitoring of Fiber Preform
Permeability for Liquid Composite Molding, Z. Liang, C. Zhang, B.
Jiang, Florida A&M University-Florida State University/Industrial
Engineering, Tallahassee, FL; C. Shih, Florida A&M University-Florida
State University/Mechanical Engineering, Tallahassee, FL

1:30 p.m. Empirically Derived Advanced Process Optimization Techniques
Utilizing Grouped Statistics, K.S. Niles, Delta Design Inc/Cohu Inc,
San Diego, CA

2:00 p.m. The Evaluation of a New Process to Produce Low Cost, High
Performance Fiber Reinforced Thermoplastic Composites, T. Hartness, G.
Musman, Southern Research Institute, Birmingham, AL; J. Dykesterhouse,
Polycomp Inc, Alanston, MI

2:30 p.m. Design of Experiments and Other Analytical Process
Improvement Implementation Techniques, K.S. Niles, Delta Design
Inc/Cohu Inc, San Diego, CA

3:00 p.m. Continuous On-Line Permeability Measurement of Textile
Structures, C. Kissinger, P. Mitschang, M. Neitzel, University of
Kaiserslautern/Institut fuer Verbundwerkstoffe, Kaiserslautern,
Germany

Session 7B

Thursday Afternoon | May 25

Room 103C

NIST Offshore Advanced Technology Program

National Institute of Standards and Technology (NIST)/Advanced
Technology Program (ATP) funded program

Chairman: Dr. H. Felix Wu, NIST/Advanced Technology Program,
Gaithersburg, MD

1:00 p.m. The Challenges of Polymer Composites in the NIST Advanced
Technology Program, H.F. Wu, National Institute of Standards and
Technology, Gaithersburg, MD

1:30 p.m. Demand for Composites in Deepwater Oil Production, D.B. Johnson, Lincoln Composites, Lincoln, NE

2:00 p.m. Challenges and Opportunities for Advanced Composites in Offshore Field Developments, M. Karayaka, Aker Engineering Inc, Houston, TX

2:30 p.m. A Successful Program for Composites in the Oil and Gas Industry, G. Galle, J. Whitehead, ABB Vetco Gray Inc/Systems Development, Houston, TX

3:00 p.m. Development of Rigid Composite Risers-A Status Report, D.B. Johnson, Lincoln Composites, Lincoln, NE; K.H. Lo, Shell E&P Technology Company, Houston, TX; H.F. Wu, National Institute of Standards and Technology, Gaithersburg, MD

3:30 p.m. Composite Drill Pipe for Offshore Petroleum E&P Operations, A.Y. Lou, Tec-Comm Ltd, Tulsa, OK

4:00 p.m. Manufacturing Technology and Design Development for Spoolable Composite Tubing, C. Lundberg, T. Walsh, H. Reynolds, Hydril Company, Houston, TX

4:30 p.m. Composite Armored Flexible Risers for Deep Water Oil and Gas Production, M. Kalman, T. Blair, M. Hill, P. Lewicki, C. Mungall, B. Russel, M. Case, Wellstream-Halliburton Subsea Systems, Panama City, FL

Session 7C

Thursday Afternoon || May 25

Room 202B

E-Beam/Microwave Processing-II

Chairmen: Dr. G.R. Palmese, University of Delaware/Center for Composite Materials, Newark, DE and Dr. Daniel Goodman, Science Research Laboratory, Somerville, MA

1:00 p.m. Electron Beam Curable Adhesives for Out-of-Autoclave Bonding of Large Composite Structures, C.A. Byrne, D.L. Goodman, Science Research Laboratory, Somerville, MA; G.R. Palmese, University of Delaware/Center for Composite Materials, Newark, DE; J.M. Sands, S.H. McKnight, U.S. Army Research Laboratory/Weapons and Materials Research Directorate, Aberdeen Proving Ground, MD

1:30 p.m. On-Line Cure Monitoring for Electron Beam Curing Composite Parts, T. Wassenberg, W. Michaeli, Institut für Kunststoffverarbeitung, München, Germany

1:00 p.m. Interpenetrating Polymer Network (IPN) Adhesives for Electron Beam Cure, J.M. Sands, S.H. McKnight, B.K. Fink, U.S. Army Research Laboratory/Weapons and Materials Research Directorate, Aberdeen Proving Ground, MD

1:30 p.m. Electron-Beam Curing of Acrylate Resins for Composites: Modeling Reaction Kinetics, B. Defoort, X. Coqueret, Laboratoire de Chimie Macromoléculaire, Villeneuve d'Ascq, France; G. Larnac, J.M. Dupillier, Aerospatiale-Matra Lanceurs Etablissement d'Aquitaine, St Medard en Jalles, France

1:00 p.m. Advanced Electron Beam Composites and Modeling Approach for Spacecraft and Transportation Applications, F. Boursereau, J.M. Dupillier, G. Larnac, D. Roussel, Aerospatiale Matra Lanceurs/Laboratoire des Matériaux Composites, St Medard en Jalles, France

Session 7D

Thursday Afternoon | May 25

Room 202C

Aircraft Applications-II

Chairmen: Robert Stratton, Lockheed Martin Aeronautical Systems, Marietta, GA and David T. Uhl, Lockheed Martin, Alledo, TX

1:00 p.m. Design of Composite Preform Fabrication Methods for Turbine Engine Components, S.E. Rosenberg, Foster-Miller Inc, Waltham, MA

1:30 p.m. Design of FML Shear Panels for Ultra-High Capacity Aircraft, P.C. Wittenberg, Delft University of Technology/Structures and Materials Laboratory, Delft, The Netherlands; A. deBoer, National Aerospace Laboratory/Structures Technology, Marknesse, The Netherlands

1:00 p.m. A New Development in High-Speed Composite Fabrication for Aerospace, Automotive and Marine Applications, J.H. Hodgkin, N. Rabu, CSIRO/Molecular Science, Clayton, Australia

Session 7E

Thursday Afternoon | May 25

Room 203A

Space Technology and Applications-II

Chairmen: Dr. Charles Y-C. Lee, Air Force Office of Scientific Research, Arlington, VA and Susan Ruth, The Aerospace Corporation, Los Angeles, CA

1:00 p.m. (CLOSED PAPER) Replacement of the Structural Adhesives Used to Bond the RSRM Nozzle, R.V. Cook, G.L. Anderson, Thiokol Propulsion/Cordant Technologies Inc, Brigham City, UT

1:30 p.m. 0.94-Meter (37-Inch) Cryogenic Demonstration Tank, M.J. Varner, D.J. Son, D.M. Lester, Thiokol Propulsion, Brigham City, UT

2:00 p.m. Sandwich Composite, Syntactic Foam Core Based, Application for Space Structures, A.J. Hodge, R.K. Kaul, W.M. McMahon, NASA Marshall Space Flight Center, Huntsville, AL; T. Reinarts, United Space Alliance, Cape Canaveral, FL

Session 7F

Thursday Afternoon II May 25

Room 203B

Automotive and Industrial

Applications-II

Chairman: Dr. Nicholas Gianaris, Ford Motor Company/Visteon Chassis Systems, Dearborn, MI

1:00 p.m. Continuous Process for Manufacturing of Friction Materials, D. Nguyen, Federal-Mogul Corporation, Winchester, VA; J. Taylor, Borden Chemical Company, Louisville, KY

1:30 p.m. Comparison of Time Dependent Responses of Two Viscoelastic Polymer Timing Devices for Use in Extended Interval Lubricators, R.F. Gibson, A. Chickmenahalli, Wayne State University/Advanced Composites Research Laboratory, Detroit, MI; F. Stoll, University of Dayton Research Institute/Aerospace Mechanics, Dayton, OH D. Bettinger, The Technology Partnership, Grosse Ile, MI

2:00 p.m. The Process Development for Composite Electric Buses Body Using Resin Transfer Molding Technology, M-F. Sheu, Y-K. Lin, Y-H. Huang, Y-C. Chang, C-L. Ong, Aeronautical Research Laboratory/CSIST,

Taichung, Taiwan, ROC

2:30 p.m. Stiffness and Failure Analysis of SMC Components Considering the Anisotropic Material Properties, M. Piry, W. Michaeli, Institut of Plastics Processing, Aachen, Germany

3:00 p.m. The Direct Strand-Deposition Process-New Methods in Compression Molding of Long-Fiber Reinforced Thermoplastics, K. Brast, W. Michaeli, Institut of Plastics Processing, Aachen, Germany

3:30 p.m. Application of Aerospace and Defense Composites Technology to Compressed Natural Gas Vehicle Fuel Tanks: A Success Story, W.E. Dick, Lincoln Composites/Advanced Technical Products, Lincoln, NE



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General Information - SAMPE '99 (44th ISSE), Long Beach, CA, May 23-May 27, 1999



- Welcome to Long Beach
- Registration
 - Registration Form
- Registration Hours
- Exhibit Hours
- Exhibit Hall Admission
- SAMPE Job Fair
- SAMPE Book Store
- SAMPE Membership Services
- Closed Papers Admittance
- Proceedings
- Final Program
- Housing
 - Hotel Reservation Form
- Transportation
- Discounted Airline and Car Rental Rates
- Fellow Banquet
- SAMPE Leadership Breakfast
- Student Symposium
- The Interagency Working Group on Fire and
- Materials (IWGFM)
- Air Force Research Laboratory
- Dimensional Control of Composites
- Tutorials
- Final Technical Program:
 - Keynote
 - Sunday
 - Monday
 - Tuesday
 - Wednesday
 - Thursday
- Program-At-A-Glance
- **Can't get to SAMPE '99? See how things are going with SAMPEcam!**

- CFA Vacuum Infusion and RTM Symposium '99
- Build Your Own Pool Cue!
- Bridge Building Contest
- Volunteer Worksheet
- Symposium Committee
- Questions?

WELCOME TO LONG BEACH

The Los Angeles Chapter of the Society for the Advancement of Materials and Process Engineering (SAMPE®) is proud and honored to host the 44th International Symposium and Exhibition. The meeting this year is being held in a new location at the Long Beach Convention Center; this venue offers many opportunities for conducting business and learning new information that will help expand your professional capabilities and expertise. A program that contains information for the engineering and business community has been assembled and presented in this preprint document. This meeting represents the final gathering of this century and it is an opportunity to preview materials and processing trends for the New Millenium.

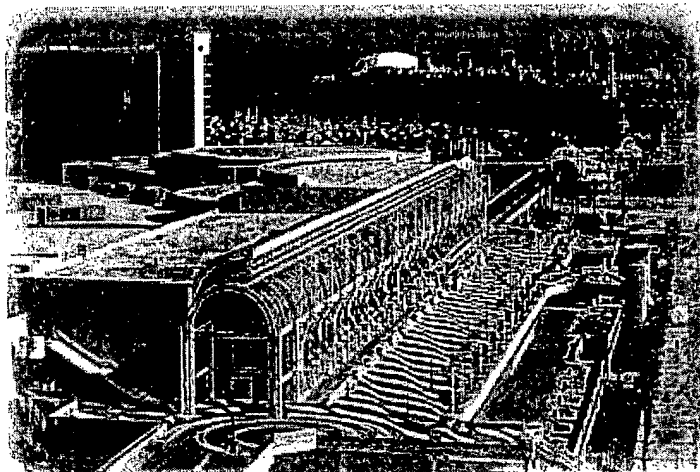
During this century there have been revolutionary changes in material technologies and these changes have paced the evolution of many products that exist today. As we prepare for a new century and a New Millenium, it is evident that materials will continue to be the pace setting technology for many high performance applications. The aerospace industry has been a pervasive developer and user of advanced materials and it appears that this will continue; sports and recreation applications are also utilizing advanced materials to achieve performance gains and marketing advantages in consumer products such as tennis rackets, golf clubs and fishing equipment. An international customer base that is expected to grow rapidly, especially within the Pacific Rim countries, is driving the markets for new materials. These conditions will provide many opportunities for developing new materials and processes that can be used in high performance products.

The program theme is "Evolving and Revolutionary Technologies for the New Millenium". This program is a very powerful collection of papers and presentations on subjects that include materials and processes, test and evaluation, design/analysis, electronics packaging/thermal management, infrastructure applications and aerospace vehicle applications. There are over 230 written papers that are included in the proceedings and there are plenary sessions for each of the subjects listed above. The plenary sessions include presentations by key individuals from the materials and aerospace communities.

Panel discussions on doing business in the New Millennium, metal composites, polymer composites and sports and recreation applications for composite materials are included in this year's program.

We, the Los Angeles Chapter, are proud to host this Millennium meeting and welcome you to the 44th meeting of SAMPE.

The Long Beach Convention Center, with the Hyatt Regency Long Beach Hotel behind it to the left. The walkway past the Convention Center leads to Shoreline Village. Across the water is the Queen Mary.



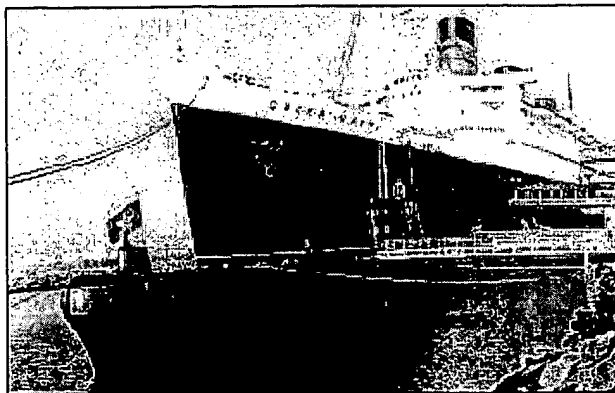
Please join us in celebration of our 55th anniversary, our new location, our new look and steps to take you to the new millennium. This program and subsequent symposium and exhibition, offers you the technology and information you will need in the future, as SAMPE has done successfully for fifty-five years.

Long Beach - A thriving beach community.

A few things that Long Beach offers:

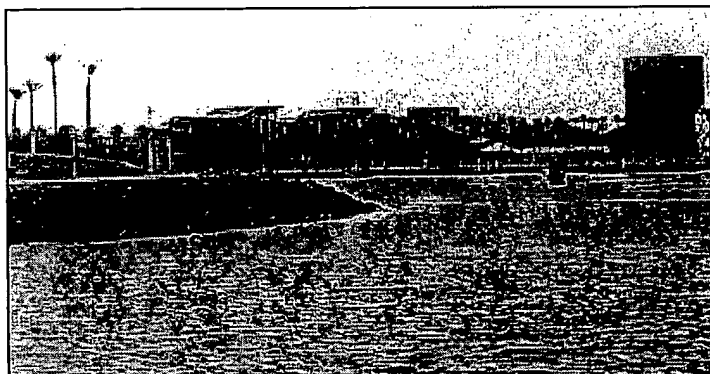
- Visit the pride of the Queen Mary Seaport - the Queen Mary.*

The majestic Queen Mary with the Russian submarine Povodnaya Lodka B-427 at her side.



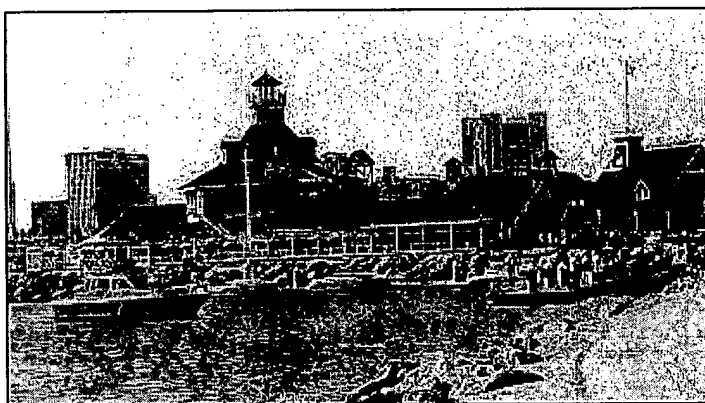
- See the Queen Mary's neighbor, the Soviet-built Foxtrot class submarine, Scorpion*
- Experience the recently opened Long Beach Aquarium of the Pacific*

The new Long Beach Aquarium of the Pacific.



- Shop on Belmont Shore Second Street
- Walk along Shoreline Village*

Shoreline Village with the Hyatt Regency Long Beach Hotel rising in the background.



- Shop and/or dine on historic Pine Avenue*
- Ride along the canals of Naples Island
- Enjoy relaxing on the beach
- And so Much More!

*Use the "no charge" Passport Long Beach Transit.

More about Long Beach

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REGISTRATION

The pre-registration form, if mailed or faxed, is to be received by May 11, to qualify for the pre-registration price. Payment must be made at time of registration as your registration will not be processed unless payment accompanies registration.

Your badge will be ready for pick up at the SAMPE pre-registration station at the Long Beach Convention Center.

It is suggested that if your registration form and fee has not been sent to SAMPE by May 11, to avoid problems for you at the registration counter, plan to register and pay on site.

Easy to Register

- PHONE (US) 800/562-7360 (outside US 626/331-0616) ext 610, 7:00 a.m. to 4:00 p.m., Pacific Time, Monday through Friday (using credit card).
- FAX the completed registration form to SAMPE 626/332-8929, 24 hours a day (using credit card).
- MAIL the completed registration form, with applicable funds, to SAMPE, PO Box 2459, Covina, CA 91722-8459.
- ON-LINE

Cancellation/Refund/Substitution Policy

If you must cancel your registration for any reason, notify SAMPE in writing by May 11. No cancellations can be accepted after that date. All registrations are subject to the cancellation policy. No telephone cancellations can be accepted.

Registrants who fail to attend, and have not cancelled as noted above are liable for the entire fee.

No refund will be given for failure to attend, late arrival, unattended events or early departure from the meeting. Refunds are processed only after the meeting.

Substitutions may be made at any time, by letter or FAX. The appropriate member/non-member rate will apply to attending substitutions. There is no charge for making a substitution.

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REGISTRATION HOURS

For your convenience, registration will be open at the Long Beach Convention Center:

Sun, May 23	1:00 p.m. - 6:00 p.m.
Mon, May 24	7:15 a.m. - 5:00 p.m.
Tues, May 25	7:15 a.m. - 6:00 p.m.
Wed, May 26	7:00 a.m. - 5:00 p.m.
Thurs, May 27	7:30 a.m. - 1:30 p.m.

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EXHIBIT HOURS

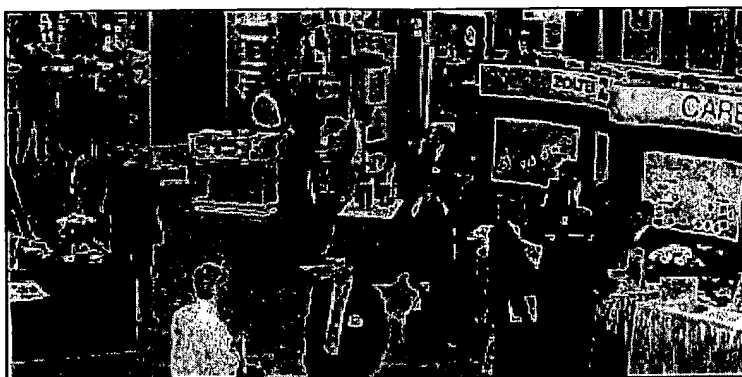
Mon, May 24	12:00 noon - 5:00 p.m.
Tues, May 25	10:00 a.m. - 6:00 p.m.
Wed, May 26	9:00 a.m. - 5:00 p.m.
Thurs, May 27	No Exhibits On Thursday

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EXHIBIT HALL ADMISSION

The

*Exhibition
Hall floor is
always
active. This
year, we
will have
SAMPEcam
bringing
live pictures
to the Web!*



All Conference registrants will automatically be admitted to the exhibits with their badges. There will be a \$25 admission fee for anyone without a complimentary pass and wanting admittance to the exhibits only. Registration for exhibits only and payment of admission fee can be done at the SAMPE registration area at the Convention Center. Those attendees with complimentary passes must register in the same area to obtain a badge.

All Must be Registered and Have a Badge to Enter the Exhibit Area.

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SAMPE JOB FAIR

Open May 25 and 26 (Tuesday and Wednesday) at the Long Beach Convention Center. Submit a one page resumé to SAMPE, P.O. Box 2459, Covina, CA 91722-8459, by April 27, or bring four copies to the Job Fair. Attendees searching for a better position or companies searching for personnel are invited to drop by. No fee for this service.

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SAMPE BOOK STORE

Once again the SAMPE Book Store will be open during the Show. Take the time to browse and purchase new additions to your personal technical library of SAMPE books and proceedings at tremendous discounts. Some available on CD-ROM! Other selected publications will also be offered.

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SAMPE MEMBERSHIP SERVICES

While you're in the registration area, drop by the Membership Services Desk. Questions about your membership? Want to renew or join? What can SAMPE offer you? *Journal of Advanced Materials*? Other questions? A member of the SAMPE staff will be on hand to serve you.

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CLOSED PAPERS ADMITTANCE

Admittance to closed papers is implemented by DoD Directive 5230.25 under the provisions of Section 1217 of Public Law 98-94. Employees of the U.S. and Canadian governments need only provide personal photographic identification and proof of employment by the government. Admission requires U.S. and Canadian citizens and resident aliens to provide:

1. Proof of citizenship or resident alien card, **plus**
2. Personal photographic identification (i.e., driver's license, passport, corporate I.D., etc.) **plus**
3. Certification credentials based on DD Form 2345.

An individual's certification credentials may be:

1. Copy of an approved DD Form 2345 for the individual, or
2. Copy of an approved DD Form 2345 for the individual's employer plus evidence of employment status with that employer (i.e. corporate I.D., business card, etc.), or
3. A listing of the individual's employer in the DoD's Qualified U.S. Contractor Access List, plus evidence of employment status with the listed employer.

Requests for DD Form 2345 may be directed to SAMPE International Business Office, P.O. Box 2459, Covina, CA 91722-8459 or phone (626) 331-0616, x 610. Questions about how to complete the DD Form 2345 should be directed to the Defense Logistics Services Center (800-352-3572).

Persons who are not citizens or resident aliens of U.S. or Canada and wish to attend closed papers must submit a request to the Foreign Liaison office in the U.S. Defense Intelligence Agency through their embassy in Washington, D.C. The U.S. Department of Defense may authorize the attendance of foreign nationals when their attendance advances

ntergovernmental programs.

ANYONE NOT COMPLYING WITH THE PRECEDING ATTENDANCE REQUIREMENTS WILL NOT BE ADMITTED TO CLOSED PAPERS. NO EXCEPTIONS CAN BE MADE.

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PROCEEDINGS

If you are unable to attend the *SAMPE '99* but would like to purchase a copy of the proceedings, please contact SAMPE at 626/331-0616, ext 642, or Fax your order - 626/332-8929 or email to sampeibo@sampe.org. Indicate choice of hardbound book or CD-ROM.

Orders placed and paid for before May 27, 1999:

- Non-California Residents - \$95
- California Residents - \$100

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FINAL PROGRAM

The Final Program will be available at the conference site and will show the specific times and locations of the presentations and other events. An Exhibitor's Directory will be available on site. The Final Program is also available [here](#).

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HOUSING

See the [housing form](#) and pertinent information. Do not send your housing form or nights deposit to the SAMPE Business Office - this will only delay processing of your housing request.

SAMPE '99 hotels are shown on a [map of downtown Long Beach](#).

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TRANSPORTATION

Los Angeles International Airport (LAX), 18 miles North of Long Beach; John Wayne/Orange County Airport, 25 miles south of Long Beach; and Long Beach Airport, only 15 minutes away and currently served by America West and American Airlines, are the most convenient airports to use when flying in.

Ground transportation, if needed, is available through companies such as SuperShuttle 310/782-6600; L.A. Xpress Airport Shuttle 310/641-8000; Long Beach Yellow Cab 310/327-1703; and others.

In addition, the Los Angeles Metro Blue Line light rail runs right to downtown Long Beach and just 1 block from the Convention Center. The Blue Line connects with the Green Line that provides service to/from LAX.

To get around Long Beach, take advantage of the free Passport bus service that goes to all major sights!

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DISCOUNTED AIRLINE AND CAR RENTAL RATES


**DISCOUNTED AIRLINE AND CAR RENTAL RATES
HAVE BEEN NEGOTIATED FOR THIS EVENT!**

**SAMPE '99
Long Beach Convention Center
May 24 - 27, 1999**

Association Travel Concepts, the official travel agency for this event, has negotiated discounts with the vendors listed below, to bring you special fares that are lower than those available to the public. By calling ATC, you will receive a savings of 5% to 15% off the regular ticket price. Some restrictions may apply.

ATC will also search for the lowest available fare on any airline serving this market. In addition, we provide advanced seat assignments & special meal requests on airline flights, frequent flyer programs, email access for convenient booking of your tickets, and more...

To take advantage of these great rates contact us at:
ASSOCIATION TRAVEL CONCEPTS
 (800) 458-9383
 atc@assntravel.com
 www.assntravel.com
 fax 619-581-3988



Official Vendors:

United: 1-800-521-4041 524HV

Alamo: 1-800-732-3232 245312

Discounts apply to travel from 5/21/99 through 5/30/99

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FELLOW BANQUET

In recognition of their distinguished accomplishments, SAMPE is proud to announce that the following members have been selected as SAMPE Fellows:

Dr. Allan S. Crasto

Mr. Charles A. Harper

Dr. Howard S. Kliger

Join SAMPE in honoring these individuals for their outstanding achievements Wednesday evening, May 26 at the Fellow Banquet at the Hyatt Regency Hotel/Long Beach (included with full registration).

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SAMPE LEADERSHIP BREAKFAST

Mr. John Willis, SAMPE International President, will discuss the state of the Society and what is in the future for SAMPE at a special breakfast on Wednesday morning, May 26 (included with full registration).

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STUDENT SYMPOSIUM

Graduate and International Student Scholarship papers will be presented at two special student sessions on Tuesday. The opportunity to present papers will also be available to SAMPE Student Chapter members.

For more information contact Dr. Anthony Saliba, University of Dayton,

- phone: 937/229-2627
- fax: 937/229-3433
- tsaliba@engr.udayton.edu

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THE INTERAGENCY WORKING GROUP ON FIRE AND MATERIALS (IWGFM)

In 1993 Federal scientists and engineers from over twenty agencies formed a new Interagency Working Group on Fire and Materials. The mission of the Group is:

To implement a coordinated, long-range national research effort to understand the fire thermal behavior of materials and develop advanced materials with improved performance. The agencies participating in the Working Group have mutual interest in fire and materials and will support cooperative research through the sharing of information and resources with the ultimate goal of improving human survivability and protecting property in severe thermal environments.

Within this mission, the IWGFM has five technical thrust areas.

- Advanced Materials and Processing
- Fire and Thermal Property Testing
- Database for Materials Fire and Thermal Properties

- Fire and Thermal Response Modeling
- Health and Environmental Response

The IWGFM is sponsoring two technical sessions on Wednesday, May 26, at SAMPE '99. In addition, it will hold its 11th general meeting on Wednesday, May 26 at 3:30 p.m. at the conclusion of the above noted sessions. This general meeting is open to all federal employees and private sector personnel with interest in fire safety and materials. If you have any questions or need more information, contact Usman Sorathia at 301/227-5588.

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AIR FORCE RESEARCH LABORATORY DIMENSIONAL CONTROL OF COMPOSITES

The Air Force Research Laboratory's Materials and Manufacturing Directorate would like to announce a review of its efforts in the area of Dimensional Control of Composites. Assembly costs are a major cost driver associated with the use of composites. One way to reduce assembly costs is to integrate many small parts into a single large structure. Thus, assembly costs such as fit-up trials, shimming, post-process machining, rework, hole drilling, and fastener installation are drastically reduced. As large integrated structures are more widely used throughout the aerospace industry, problems can occur due to poor dimensional control resulting from prepreg thickness variation, tolerance accumulations, spring-in, and residual stresses developed during cure and cool down. Poor dimensional control results in poor fit-up and can lead to decreased performance in load capability, aerodynamics, signature, and in increased assembly costs. AFRL is sponsoring several programs to develop techniques for improved dimensional control in large integrated structures. (See Session 6A chaired by Dr. John Russell of AFRL.)

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CFA VACUUM INFUSION AND RTM SYMPOSIUM '98

- The most comprehensive program of its type in the world.
- May 24-25, Long Beach, California
- Sponsored by CFA, held in conjunction with SAMPE '99.

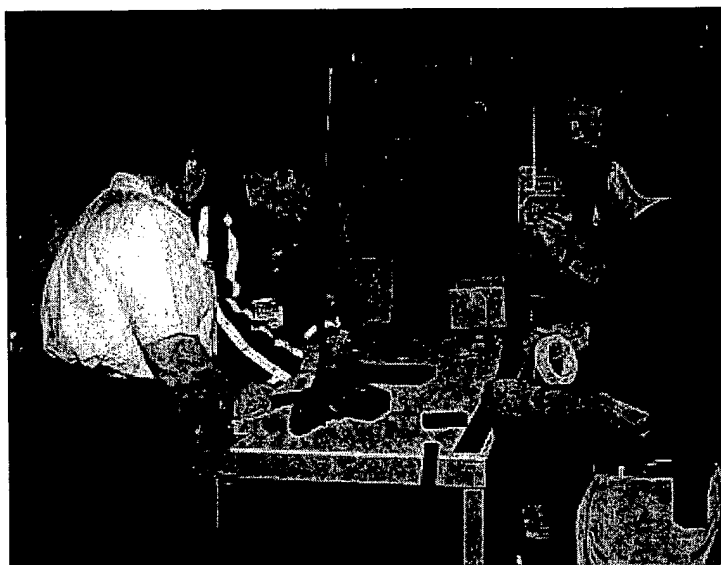
For more information on this program, please contact the [Composites Fabricators Association](#), 1655 N Fort Myer Dr, Suite 510, Arlington, VA 22209; (703)-525-0511;

(703)-525-0743 (fax); cfa-info@cfa-hq.org (e-mail)

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BUILD YOUR OWN POOL CUE!

The knowledgeable and the novice meet at the fabrication tables in the Pool Cue area. If you don't have a pool table to go with the cue, it makes a great pointer in your conference room (if, indeed, you have one of those)!



Where else but at SAMPE '99 could you build your own all-composite pool cue? Yes, SAMPE is pleased to team with Century Design, a long time SAMPE exhibitor, and Lynco, to bring you a new recreational product to carry home from this year's show. A pool cue! After two years of building golf club putters, SAMPE attendees have asked for pool cues.

The same great team developed to produce the putters are back again to help you make your composite pool cue. These same experts and suppliers of all the equipment and materials will be there to show you the steps, including:

- Cutting Prepreg
- Wrapping Prepreg on the Mandrel
- Shrink Wrapping

- Oven Curing
- Cue Shaft Grinding
- Cue Shaft Finishing
- Tip Ferrule Bonding
- Grip and Butt End Bonding

Demonstrations and pool cue manufacturing will take place during the Exhibition show. Hours on Monday, Tuesday and Wednesday. The number of participants is limited. The last starting time will be 1:00 p.m. on Wednesday. The demonstration will take approximately one hour and pool cues may be picked up within a few hours.

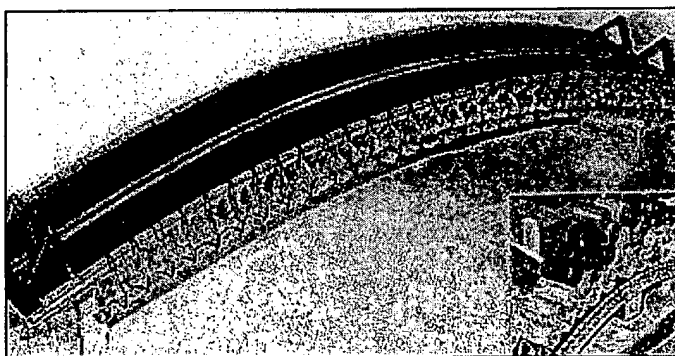
There will be a minimum charge to defray the cost of equipment and materials, all payments for this are to be made on-site.

All pool cues must be picked up during the Show. Sorry, SAMPE will not ship any that are not picked up.

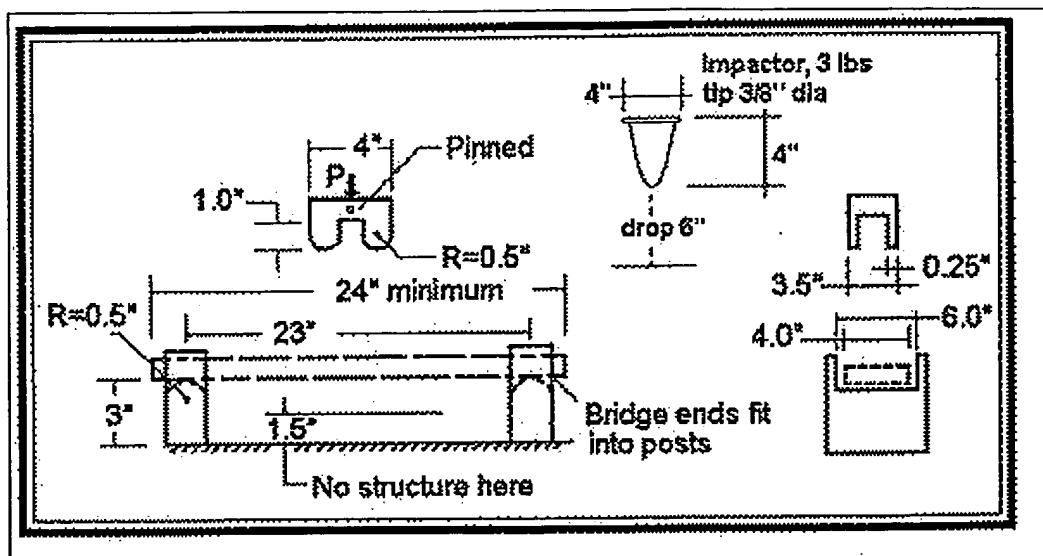
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SUPER LIGHT WEIGHT COMPOSITE BRIDGE BUILDING CONTEST

*A bridge from a
previous contest.*



The program committee for SAMPE '98 is organizing a composite bridge building contest fashioned after the high school contests conducted by the SAMPE New Jersey Chapter for the past six years. But this time you can compete against your fellow SAMPE professionals! If you have ever thought you could build a better mousetrap, here's your chance. So read the rules below, send in your application, get your kit, build your bridge, and come to Anaheim and compete. We'll have plenty of prizes, but the real reward will be just having fun being a kid again.



The Rules

1. Objective is to design and build the most weight efficient bridge constructed of composite materials. Nominal bridge dimensions will be 24" long x 4" wide and will be supported by two posts placed 23" apart. Bridge will be center loaded. The most weight efficient bridge will be judged the winner.
2. The contest is open to all SAMPE members and will be divided into professional and full-time student classes. A student may enter the professional class, but a professional cannot enter as a student.
3. The contest is further divided into two material grades. Grade 1 will be limited to the materials supplied in the kit or "equivalent materials" as allowed by the judging committee. Grade 2 will include any other materials available to the competing team.
4. Materials: The use of any composite material is permitted. The use of non-composite materials such as wood, concrete and metal is also permitted, but their success is questionable due to their lower efficiencies. "Equivalent materials" must be approved in advance of the testing by submittal of an equivalent materials list in writing. If the judging committee does not approve the equivalence, then the bridge automatically goes into Grade 2.
5. A kit consisting of fibers, fabrics, honeycombs and epoxy resin will be shipped to all participants by April 1, 1999. Bridge construction is not limited to materials in the kit.
- 5a. Bridge Geometry: Minimum bridge dimensions must be 24.0" (length) and 4.0" (width). Roadway surface must be continuous and opaque and must be constructed so as to support a 3.5" wide vehicle driving across it.

6b. Roadway surface must be uniform across and down the span; it cannot be selectively enforced in the center where the loads are applied. All other dimensions must conform to the drawing. The bridge will be weighed immediately prior to test.

7. Bridges will also be subjected to an NDE scan to insure that rule 6b (selective enforcement at only the load points) is not violated. Should an anomaly be observed, then after load testing the bridge will be destructively examined. Bridges in violation will be disqualified.

8. Bridges will first be subjected to a single impact load at the geometric center of the roadway. The impact, somewhat approximating a large, slow, cold meteor, will be applied by dropping a 3 pound conic steel weight from a height of 6 inches onto the bridge, which will be placed on the floor and manually restrained.

9. If the bridge survives the impact loading, it will be mechanically loaded at center span. Deflection will be measured by crosshead motion. Maximum load P is defined as the load at failure or the load at 1" crosshead deflection, whichever is greater. Bridge efficiency is computed as P/w where w is the bridge weight. The bridge with the highest value of P/w shall be judged the winner. A loading machine having a 25,000 pound capacity will be used.

10. Load testing will be conducted in a special area on the exhibition floor during open exhibition hours. Contestants will be notified of their testing time in advance. Each bridge will be loaded to failure once. No retests are permitted. A contestant may submit only one bridge for testing per entry fee. Multiple entries are permitted. Testing will begin Tuesday morning at the Instron Booth (#1439).

11. Prizes will be awarded for the best efficiencies in each category. In addition, two prizes for most innovative use of composite materials will be given in the professional and student classes.

12. The entry form along with a \$25 fee to defray contest costs must be submitted no later than March 25, 1999.

[Entry Form](#)

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VOLUNTEERS NEEDED

[Volunteer Worksheet](#)

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SYMPOSIUM COMMITTEE

Sponsored by the SAMPE Los Angeles Chapter

General Chairman	Dr. Leslie Cohen Culver City Composites
Associate General Chairman	Jerry Bauer The Aerospace Corporation
Technical Program Chairman	William E. Davis Applied Material Technologies, Inc.
Associate Technical Program Chairmen	George Epstein Composites and Adhesives Newsletter
	Dr. Glenn Chang Culver City Composites
	Mark R. van den Bergh DWA Aluminum Composites
	Bruce Leonard Boeing Company
Finance Chairman	W.T. Chen Hughes Aircraft Company
Arrangements Chairman	Susan Castro Castro Consulting Engineering
Audio/Visual Chairman	Dr. Glen Binegar The Aerospace Corporation
Registration Chairman	Bill Heimerdinger Northrop Grumman
Publicity Co-Chairman	Theodore D. Lynch GHL, Inc.
	Robert Hunt Clark-Schwebel
	Eric W. Winkler

Volunteers Co-Chairman	Richmond Aircraft Products
	Bill Heimerdinger Northrop Grumman
Congressional Liaison	Theodore D. Lynch GHL, Inc.
Advisory Board	John Willis Graphite Master
	John Hoggatt Boeing Company (retired)
	Samuel J. Dastin Dastin Associates Co.
	Ray Williams Textile Products, Inc.
	Morton Kushner Boeing Company (retired)
	Dr. Joseph F. Garibotti Applied Material Technologies, Inc.

Technical Program Track Leaders

Materials and Processes	Tia Benson Tolle A.F. Research Laboratory
Inspection and Test	John Moylan Delson Testing Laboratories
Design and Analysis	Laura Thompson Boeing Company
Electronics/Energy	Robert W. Seibold Raytheon Systems Company
Infrastructure	Gary Hawkins The Aerospace Corporation
Aerospace Vehicles	Dr. John Connell NASA Langley Research Center

World Sector Leaders

	Dr. Satoshi Someya
--	--------------------

Japan	Yokohama Rubber Corporation
	Dr. M. Kadoya Japanese Aircraft Development Corp.
South America	Sergio Mayer Embraer Aeronautica
Singapore, Australia, China	Dr. Ching-Long Ong CSIST/Aero Research Laboratory
Europe	Hans Prykop AIK
Canada	Leonard K. John deHavilland, Inc.
	Spyridion Cacoutis deHavilland, Inc.
Russia	Dr. V.G. Lutsau Mechanical Engineering Research Institute

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QUESTIONS ?

Call SAMPE at 800/562-7360, or Fax 626/332-8929, or sampeibo@sampe.org
 Exhibits: Rosemary Loggia, ext. 601, or exhibits@sampe.org
 Registration: Greg Guntle, ext. 610, or registration@sampe.org

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HOMEPAGE**

This page was last updated on May 16, 1999.

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General Information - SAMPE® 2004 (49th ISSE), Long Beach, CA May 16-May 20, 2004

The SAMPE Utah Chapter

Welcomes you to the SAMPE 2004 Conference, the 60th Anniversary of SAMPE. The theme for this year's International SAMPE Symposium and Exhibition (ISSE) is "Materials and Processing Technology – Celebrating 60 Years of SAMPE Progress". We have organized technical sessions with the most paper presentations ever — over 350 papers. We hope, with these technical presentations and the full array of exhibitors, your experience at SAMPE will be both beneficial and enjoyable.

We want to give a special **thank you** to the authors, speakers, panel chairmen, session chairmen and volunteers (especially students from Brigham Young University and the University of Utah) who donated their time and energy to make this a successful ISSE.

Many thanks to the exhibitors who have taken their time and effort to exhibit. As you know, a conference has two key components — a top quality technical program and high quality exhibitors. We are grateful that both of these components have come together for this SAMPE conference and the 60th anniversary celebration.

We must also give a special thanks to the SAMPE International Business Office (IBO) for their assistance and patience in mentoring the SAMPE Utah Chapter. Their help and understanding with our committee is greatly appreciated. If you get a chance, please be sure to thank the SAMPE IBO personnel as well as the SAMPE Executive Cabinet for all their hard work to make SAMPE a success for over 60 years now.

We hope you will find this conference informative, educational, enjoyable, relaxing and a good place to meet old business associates as well as find new business opportunities.

***John E. Green and Steven R. Rodgers
General Co-Chairmen, SAMPE 2004***

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SAMPE IS HONORED

To present the George Lubin Memorial Award for Achievement to Dr. Thaddeus H. Sandford.

This award is the highest that the Society confers in recognition of individuals who have meritoriously enhanced the attainment of the objectives of the Society. The criteria for the award include important contributions to and fostering the applications of advanced materials and processes technology, for which the recipient has developed an international reputation. Dr. Thaddeus is Vice President of Engineering, Boeing Integrated Defense Systems, Seal Beach, California.

The award is given in honor of George Lubin (1913-1984) who was a "technological giant" in the plastics industry as an innovator, educator, author, international consultant and lecturer. The award has been given to internationally renowned individuals working in the M&P areas, and SAMPE is proud to welcome Dr. Sandford to this elite group of winners of the George Lubin Memorial Award.

This award will be presented to Dr. Sandford at the Keynote Address, Tuesday morning, May 18.




Congratulations



In recognition of their distinguished accomplishments, the following members have been selected as SAMPE Fellows and will be inducted as Fellow at the Renaissance Hotel on Monday evening.

Dr. James A. Harvey • Dr. Jude Iroh • Dr. Jesa Kreiner • Ms. Pamela K. Strong

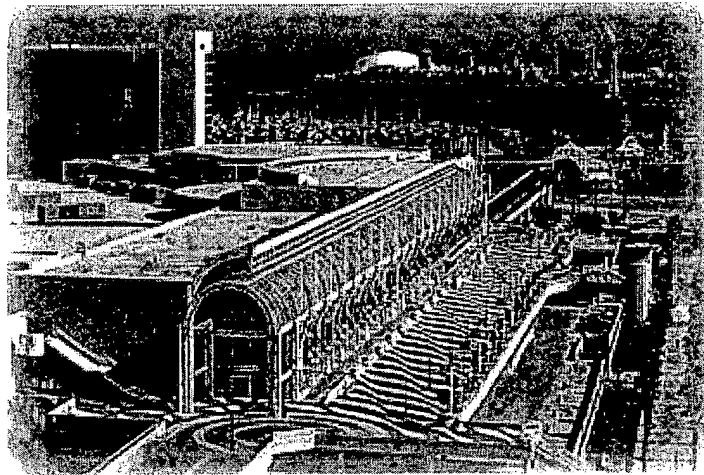
Please join SAMPE in honoring these individuals for their outstanding achievements.

Co-locations and Participating Organizations

	Lockheed Martin Aeronautics Company	Supplying our Keynote Speaker Mr. Michael L. Fortson
	Interagency Working Group on Fire and Materials	Sessions on Fire Safe Materials and <u>IWGFM</u> <u>Business Meeting</u>
	NASA	Sponsoring our SAMPE Luncheon and supplying our Luncheon Speaker, Dr. Harley Thronson
	MIL-17- Handbook Group	Providing a tutorial and a panel

		
	National Center for Advanced Manufacturing	Session on Advanced Composites Manufacturing Technology
	The American Ceramic Society	Endorsing and promoting our conference to their members

The Long Beach Convention Center, with the Hyatt Regency Long Beach Hotel behind it to the left. The walkway past the Convention Center leads to Shoreline Village. Across the water is the Queen Mary.



A Bonus

Long Beach - a visitor and pedestrian friendly community, offers many attractions - take the time to enjoy some of them.

- Experience the Long Beach Aquarium of the Pacific
- Visit the pride of the Queen Mary Seaport - The Queen Mary

- Walk along Shoreline Village - shops, dining, boating center
- Ride along the canals of Naples Island
- Shop and/or dine on historic Pine Avenue
- Shop on Belmont Shore's Second Street
- and so much more!

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REGISTRATION/BOOKSTORE HOURS

Registration Hours/Bookstore Hours

Sunday, May 16	1:00 p.m. - 6:00 p.m.
Monday, May 17	7:30 a.m. - 5:00 p.m.
Tuesday, May 18	7:15 a.m. - 6:00 p.m.
Wednesday, May 19	7:15 a.m. - 5:00 p.m.
Thursday, May 20	7:30 a.m. - 2:30 p.m.

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Exhibit Hours

NO EXHIBITS ON MONDAY

Tuesday, May 18 10:00 a.m. - 5:00 p.m.

Welcome Reception On Show Floor and 60th Anniversary Celebration 5:00 p.m. - 6:00 p.m.

Wednesday, May 19 10:00 a.m. - 5:00 p.m.

Thursday, May 20 10:00 a.m. - 2:00 p.m.

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Pre-Registrants

Attendees that are pre-registered can pick up their badges at the pre-registration counters at the Convention Center.

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On-Site Registrants

Do not fill out the pre-registration form that is in the Preliminary Program. You must fill out an on-site registration form when you are ready to register.

Payment in full must be made at the time of registration. Acceptable forms of payment are cash, check or credit card (VISA, MasterCard, American Express).

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CANCELLATION/REFUND/ SUBSTITUTION POLICY

No cancellations can be accepted after April 26.

No refund will be given for failure to attend, late arrival, unattended events or early departure from the meeting.

Refund requests must be in writing. There is a \$50 service charge on all refunds. Refunds will be processed after the meeting.

There is no charge for making a substitution. The appropriate member/non-member rate will apply to attending substitutions.

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We're Celebrating SAMPE's 60th Anniversary

1944-2004

The history of a remarkable organization. . . the history of our industry.

On March 17, 1944, nine material and process engineers, representing five aircraft companies in the Los Angeles area, assembled at the Northrop Aircraft Company in Hawthorne, California, and discussed forming an organization that would meet periodically to exchange ideas and seek solutions for the technical challenges that were facing the U.S. aircraft industry. From these origins as a strictly U.S.-based local club the organization grew first into a regional organization and then, in 1960, to a national Society. By the end of the 1970s the Society began to become international and by the mid-1980s had strong chapters in Europe, Japan and Canada, and chapters in Australia, Taiwan, Far East (Hong Kong), Beijing, and Korea by 1990. Today our small local club is a strong international Society. Nonetheless, it has many of the same goals—to discuss technical challenges in material and process engineering and to exchange information, ideas and solutions.

The success of our industry has depended strongly on contributions from SAMPE members. The most remarkable people in our industry have been SAMPE members, and the most remarkable events in our industry have been produced by those members. We have much history to celebrate, and much still to forge.

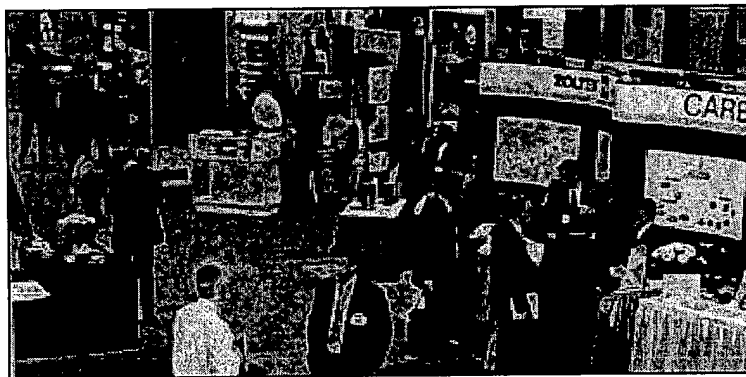
At SAMPE 2004 we are celebrating the accomplishments of our Society and the achievements of its members. Our celebration will include a combination of fun, reflection, history, and remembrance. We will be emphasizing not only the history of our Society and industry, but, in particular, the people who made that history.

We'll be recognizing our outstanding members and celebrating our history throughout the week—at Monday's Fellow Banquet; at Wednesday's luncheon; items of special interest will be displayed in the main lobby of the convention center throughout the week. The big bash will be on Tuesday afternoon at 5:00 p.m., immediately after the close of the exhibits. Join us in the special anniversary festivities that will take place in the main lobby of the convention center. Come and celebrate both our 60th anniversary and our evolution into a global society! Enjoy a traditional cake ceremony presented by SAMPE Japan, toast our Society with champagne provided by SAMPE Europe, and swing to the music and dancing of the Big Band era. Finally, take a piece of 60th Anniversary birthday cake and share an appreciation of how far we have come since 1944.

Celebrate and be proud of our remarkable organization—SAMPE!

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EXHIBIT HALL ADMISSION



All Conference registrants will automatically be admitted to the exhibits with their badges. There will be a \$75 admission fee for anyone without a complimentary pass and wanting admittance to the exhibits only. This fee allows entrance any or all days exhibits are open. Registration for the exhibits only and payment of admission fee can be done at the SAMPE Registration area at the Convention Center. Those attendees with complimentary passes must register in the same area to obtain a badge.

- **All Must be Registered and Have a Badge to Enter the Exhibit Area.**

[SAMPE 2004 Contract](#)

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SAMPE ON-SITE CAREER FAIR

JOB FAIR



The On-site Career Fair offers networking opportunities for job seekers, employers and recruiters. The chance to meet face-to-face complements the online offerings of the Virtual Career Fair.

- **Job seekers: Submit your resume before the show for inclusion in the resume book. Employers and recruiters will have access to the book before, during and after the show.**
- **Employers and recruiters: Submit your job postings for inclusion on the jobs bulletin board. Potential candidates can browse the postings during the show.**

Submit job postings and resumes to berenberg@alum.mit.edu in plain text or Microsoft Word format. All documents should be print-ready.

The Career Committee will make a limited number of copies for the onsite fair. Job seekers should plan to bring additional hard copies of their resumes.

Job postings and resumes will be available for download from this page prior to the show (check back for updates). Job seekers should include a short (one paragraph) summary of their background, to be used as a description below their download link. If you do not want your resume posted online prior to the show, please note that in your message.

On-site Interviews -New This Year!

The Career Committee will be coordinating onsite interviews during exhibit hours. If you are an employer or recruiter and would like to set up on-site interviews, contact berenberg@alum.mit.edu, and include job descriptions and the times you would like to interview. Job descriptions will be posted here as soon as they are received, allowing candidates to sign up for

Interview slots prior to the show. Resumes will be made available to interviewers as slots are filled.

Career Planning

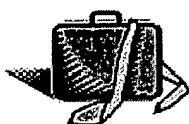
Opportunities are available for recruiters to offer short presentations on career planning topics, or one-on-one sessions to aid job seekers.

Contact berenberg@alum.mit.edu if you are interested.

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VIRTUAL CAREER FAIR

JOB FAIR



SAMPE 2004 (49th ISSE) will include a Virtual Career Center from May 17-20, 2004, hosted by Aeroindustryjobs (www.aeroindustryjobs.com). This service is a free benefit for SAMPE members in need of hiring people or in need of finding a job. SAMPE members can benefit from the Virtual Career Center by:

- **Posting a resume that Hiring Managers, Human Resources Managers and Recruiters can view online during the week of the conference.**
- **Posting a job opening that SAMPE members can view and apply for online during the conference**

To submit a resume or job posting and to view resumes and job postings during the event, follow these instructions:

- **Go to www.aeroindustryjobs.com**
- **Click on the "Alliances" button on the left of the screen**
- **Click on the link for "SAMPE"**
- **Scroll down the page to the Events - SAMPE 2004**

- **Click In the appropriate link to Submit or View Resumes and Job Postings.**

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SAMPE BOOKSTORE

Once again the SAMPE Bookstore will be open during the Show. Take the time to browse and purchase new additions to your personal technical library of SAMPE books and proceedings at tremendous discounts. Many available on CD-ROM! Other selected publications will also be offered.

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MEMBER SERVICES

Are you interested in:

- **Joining SAMPE**
- **Renewing your membership**
- **Asking questions about your membership**
- **Getting more information about SAMPE**

There will be SAMPE Staff members in the SAMPE booth on the show floor to talk with you. New members can learn about the outstanding benefits and services available through membership - current members can review these benefits and services.

Drop by with questions, comments, to introduce yourself, to say hello!

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VISA APPLICATIONS

It is suggested that you apply for a Visa as early as possible, if you are an attendee from a country where Visa's are required. It currently takes longer

o get one processed than it did in previous years.

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CLOSED PAPERS ADMITTANCE



Admittance to closed papers is implemented by DoD Directive 5230.25 under the provisions of Section 1217 of Public Law 98-94. Employees of the U.S. and Canadian governments need only provide personal photographic identification and proof of employment by the government. Admission requires U.S. and Canadian citizens and resident aliens to provide:

- 1. Proof of citizenship or resident alien card, plus**
- 2. Personal photographic identification (i.e., driver's license, passport, corporate I.D., etc.) plus**
- 3. Certification credentials based on DD Form 2345.**

An individual's certification credentials may be:

- 1. Copy of an approved DD Form 2345 for the individual, or**
- 2. Copy of an approved DD Form 2345 for the individual's employer plus evidence of employment status with that employer (i.e. corporate I.D., business card, etc.), or**
- 3. A listing of the individual's employer in the DoD's quarterly Qualified U.S. Contractor Access List, plus evidence of employment status with the listed employer.**

Requests for DD Form 2345 may be directed to SAMPE International Business Office, P.O. Box 2459, Covina, CA 91722-8459 or phone (626) 331-0616, x 610. Questions about how to complete the DD Form 2345 should be directed to the Defense Logistics Services Center (800-352-3572).

Persons who are not citizens or resident aliens of U.S. or Canada and wish to

Attend closed papers must submit a request to the Foreign Liaison office in the U.S. Defense Intelligence Agency through their embassy in Washington, D.C. The U.S. Department of Defense may authorize the attendance of foreign nationals when their attendance advances intergovernmental programs.

ANYONE NOT COMPLYING WITH THE PRECEDING ATTENDANCE REQUIREMENTS WILL NOT BE ADMITTED TO CLOSED PAPERS. NO EXCEPTIONS CAN BE MADE.

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PROCEEDINGS

If you are unable to attend SAMPE 2004, but would like to purchase a copy of the proceedings, contact SAMPE at 626/331-0616 ext.602: Fax 626/332-3929 or e-mail bookorders@sampe.org.

Available on CD-Rom Only

Orders placed and paid for before May 20, 2004: \$115

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TUTORIALS

A Great Way to Advance your Knowledge of Material and Process Engineering from the Experts

- 9 Great Educational Tutorials to Expand your Knowledge Base
- SAMPE Provides Opportunity to learn about Advanced M&P
- Tutorials Instructed by Experts in their Field of Technology
- Technology Coverage from the "Basics"

- to the more "Advanced"
- Tutorial Handouts Covering the Topic Presentation
 - Special MIL-17 Handbook tutorial



Educational opportunity knocks at your door!

SAMPE is offering conference attendees the unique opportunity to expand their knowledge base by taking advantage of carefully prepared technology tutorials.

Engineers, managers, technicians, students, sales personnel, shop floor personnel, and sales/business development specialists will find that all of these tutorials are instructive and practical in the advancement of their education of the technology field. Tutorial attendees will find that a number of the Instructors now offer a Power Point CD-ROM handout of the tutorial. For a small investment of your time, and at a fraction of the cost of a full short course, attendees can obtain significant information packed into a very intensive session. Company training needs are often filled by SAMPE's excellent tutorial offerings. Since class size is limited, early sign-up is highly recommended.

SAMPE reserves the right to cancel any tutorial that does not have a minimum of 12 registrants two weeks before the conference.

Details of Tutorials

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TRANSPORTATION

Los Angeles International Airport (LAX), 18 miles North of Long Beach; John Wayne/Orange County Airport, 25 miles south of Long Beach; and Long Beach Airport, only 15 minutes away, are the most convenient airports to use when flying in.

Ground Transportation - special arrangements have been made with:

Prime Time Shuttle, 1-800-RED-VANS or 1-800-733-8267

Press "1" for reservations..

Book Online: www.primetimeshuttle.com or www.redvans.com.

\$13 one way, when you mention the SAMPE Conference (round trip group rate \$26).

Pick up service from all Long Beach Hotels to LAX & Confirm your pick up time one day before departure.

Economical Ground Transportation - The Convention Center area can also be reached from LAX by taking a free bus to the Aviation Station of the Metro Green Line (East) and transferring to the Metro Blue Line (south), exiting at 1st Street, short walk to hotels. Call 213/922-7000 for more information, or check [Los Angeles Metro Blue Line](#).

To get around Long Beach, take advantage of the free Passport bus service that goes to all major sights!

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FELLOWS BANQUET

Renaissance Hotel Ballroom (2nd floor), Monday, May 17

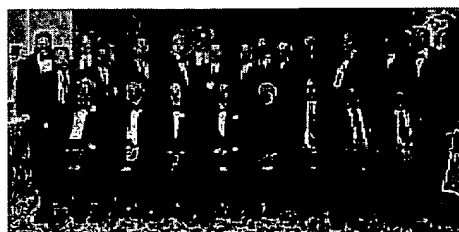
In recognition of their distinguished accomplishments, SAMPE is proud to announce the following members have been selected to be inducted as SAMPE Fellows:

Dr. James A. Harvey

Dr. Jude Iroh

Dr. Jesa Kreiner

Ms. Pamela K. Strong



Plan to join SAMPE in honoring these individuals for their outstanding

achievements, Monday evening, May 17,
at the Renaissance Hotel in Long Beach.

KEYNOTE

Keynote Address

Tuesday, May 18, 8:00 a.m.

"F-35: 21st Century Fighter Design and Materials Technology"

**Mr. Michael L. Fortson, Lockheed Martin
Aeronautics Company, Fort Worth, TX
Joint Strike Fighter (JSF) Deputy Air Vehicle
Development Team Lead**



It seems we've come full circle from the early 1900's when the Wright Brothers utilized fibrous materials (wood and fabric). They were very aware of the high strength vs. weight advantages, how easy they were to work with, and how no special tooling or equipment was required. But these materials weren't very "robust", and as metallics came onto the scene, they became the material of choice instead. But as these aircraft became Weapons Systems, we needed the structure to be much less of the flying weight, so that systems and weapons could be maximized.

About the time that SAMPE was founded, man developed a means of making a robust fibrous material, composites, that once again displayed the high strength-to-weight ratios, essential to modern fighter aircraft design. But the need for "special" equipment raised its ugly head with this innovation in the form of large autoclaves, presses, etc. needed to cure or consolidate the raw material into usable aircraft structures.

The F-35 JSF is being designed to replace a large number of legacy aircraft

for the USAF, USN, USMC and the UK. The F-35 must not only have superior performance to legacy aircraft, it must also be affordable. The performance, weight, and low observable goals necessitate using composite materials and processes. However, the affordability requirements mandate that we find a way to build the structure more efficiently than in the past and avoid risk. In addition, this will be the first Low Observables aircraft that will field 1000's vs. 100's; not only for the U.S. government customer, but also for the UK, and a number of potential International partners. This presentation describes the JSF's challenge to meet these sometimes-competing requirements, and how the F-35's approach is truly revolutionary in developing superior performance in an affordable product. Mr. Fortson is currently Director, JSF Deputy Air Vehicle Development Team Lead at Lockheed Martin Aeronautics Company in Fort Worth, TX. He is responsible for the design, development, and the manufacture of the F-35 Joint Strike Fighter. He had previously led the multi-company JSF Enterprise, as its Affordability and Continuous Improvement Director, ensuring that the Air System was designed to be affordable throughout its life cycle.

He had a short tour in a company staff organization, Enterprise Productivity, which helped develop the new Company ConOPs (when 3 Aero companies merged to one), and applied lean concepts to "Above the Floor" company functional organizations. Prior to that, most of his LM experience resided with the F-22, managing several aspects including materials & processes, edge/empennage design, composites manufacturing, final finishes and RCS evaluation, and finally all manufacturing support of the assembly line. He just retired from a second career in the AF Reserves where he was a Lt. Col. Assigned to the B-2 SPO's Low Observables Directorate, with extensive experience in aircraft battle damage repair, resulting in his deployment to every major conflict.

In February 2002, he was awarded the National Black Engineer of the Year Award for Career Achievement. He was also honored in March by the National Society of Black Engineers, receiving their top award, Distinguished Engineer, at their 2002 Golden Torch Awards Ceremony.

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SPECIAL LUNCHEON SPEAKER

Wednesday, May 19, 12:00 noon

Convention Center Ballroom (2nd floor)

“NASA’s Plans for Future Space Exploration”

Dr. Harley Thronson, Director of Technology in the Office of Space Science at NASA Headquarters, Washington, DC

For the past 4 years, NASA spacecraft have been turning our vision of Mars from the world of fantasy and remote astronomy into science fact and discovery. Early NASA missions showed that Mars indeed has channels, perhaps cut by waters of ancient Martian rivers. *Spirit* and *Opportunity*, the two NASA rovers on the surface of Mars, are revealing this once-wet world as it really is . . . and there are more exciting discoveries yet to be made! Dr. Thronson will review the most recent results from the Mars rovers and describe NASA’s science and exploration plans for the next decade. While investigating Mars and, perhaps, finding evidence for life, NASA also will be expanding the research for life’s other homes beyond the Solar System by constructing over the next two decades increasingly large optical systems to investigate hypothetical Earth-like world around neighboring stars.

In addition, Dr. Thronson will give an overview of NASA’s bold new vision for exploring our Solar System and beyond. The fundamental goal of this vision is to advance U.S. scientific, security, and economic interests through a robust space exploration program. In support of this goal, the United States will implement a sustained human and robotic program for which a major milestone will be a human return to the Moon by the year 2020, in preparation for human exploration of Mars.

Dr. Thronson is Director of Technology in the Office of Space Science at NASA Headquarters, Washington, DC. His responsibilities include selection and development of advanced technologies, which will significantly enhance future space science missions such as future large astronomical observatories and robotic missions to Mars and other planets. He also coordinates technology investments with other NASA enterprises and agencies.

His previous duties at NASA have included serving as the Acting Science Program Director for the Astronomical Search for Origins and Planetary Systems. He also served as the senior scientist for Hubble Space Telescope, the Spitzer Space Telescope, the James Webb Space Telescope, and a number of other missions.

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UNIVERSITY RESEARCH SESSIONS

Graduate and International Student Scholarship papers will be presented at two special University Research Sessions on Tuesday. The opportunity to present papers will also be available to SAMPE Student Chapter members.

For more information contact Dr. Anthony Saliba, University of Dayton, phone: 937/229-2627; fax: 937/229-3433; e-mail: Tsaliba@engr.udayton.edu.

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Important Notice from SAMPE

Due to circumstances beyond our control, some papers were withdrawn by the authors prior to preprint publication. SAMPE reserved the right to cancel any Tutorial if there was not a minimum number of registrants signed up two weeks before the Symposium.

Please

As a courtesy to all speakers, we request that all cell phones and pagers be turned off during all presentations.

We appreciate your cooperation.

Exhibit Hall Admission

ALL MUST BE REGISTERED AND HAVE A BADGE TO ENTER THE EXHIBIT HALL.

Conference registrants are automatically admitted to the exhibits with their badges. Complimentary Pass holders must register to get a badge to enter. Anyone not registered or not having a Complimentary Pass must pay a \$75 admission fee. This fee allows the attendee into the exhibit area on all three days of the exhibition.

All registrations will be handled at the SAMPE registration area.

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SAMPE Speakers/Session Chairs

The Speaker Ready Room, Room VIP A (lobby level) will be open Monday, May 17 through Thursday, May 20, 7:00 a.m. – 5:30 p.m.

A limited number of laptops will be available during these hours for presenters to preview their presentations one last time before their presentation. However, it is not intended for allowing presentation modifications since the original presentation should already have been reloaded into the Session Chair's laptop well in advance of the conference.

Please note that your Session Chair will not have their specific laptop available in the Speaker Ready Room. If you did not send your presentation to your Session Chair for preloading in the weeks preceding the conference, it is imperative that you coordinate with your Session Chair at least 2 hours prior to the start of your Session! The staff in the Speaker Ready Room will try to assist you in coordinating with your Session Chair on site. Experience has shown that preloading presentations alleviates startup problems, computer compatibility problems, and allows the Session Chairs to "hyperlink" talks so the session flows smoothly and without delays.

Each presentation has a fixed 30-minute time slot in the final program schedule with no time to reboot new computers.

There Are Always Some Rules

Persons under 13 years of age are not permitted on the exhibit floor at any time regardless of affiliation or circumstances. This rule applies to exhibitors as well as attendees.

Photos may be taken only with the permission of the booth personnel.

No Smoking in the Convention Center.

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Event Locations

Events are being held at both the Convention Center and the Renaissance Hotel. Check this Final Program for location of events.

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Show Management Desk

This desk is located near the Blaine service desk at the back of the exhibit floor. Exhibitor concerns and general show questions may be addressed here.

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General Information Center/Message Board

This Center is located on the lobby level of the Convention Center, near the registration area. It is open during registration hours. You may want to check the message board throughout the day as no paging system is available, nor can messages be delivered.

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SAMPE 2004 Luncheon - Convention Center Ballroom (2nd floor)

Wednesday, May 19 12:00 noon

Yellow Banquet - Renaissance Hotel

Renaissance Ballroom (2nd floor)

Monday, May 17 7:00 p.m.

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Lost and Found

"Found" belongings and lost badges will be held at the SAMPE Information/Welcome Center. Any items not claimed will be discarded two weeks after the close of the conference.

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Press Room

The Press Room is located on the lower level to the left before entering the Exhibit Hall. Press badges must be picked up in the SAMPE Registration area.

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Volunteers Center

The Volunteers Center is located in VIP A, on the lobby level. Check in at this room for your assignment and instructions.

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Special SAMPE *Thank You* to the following for their participation/support at SAMPE 2004

THANK YOU

Lockheed Martin Aeronautics Company

Supplying our Keynote Speaker Mr. Michael L. Fortson

NASA

Sponsoring our SAMPE Luncheon and Luncheon Speaker Dr. Harley Thronson

MIL-Handbook-17

Providing a tutorial and a panel

Interagency Working Group on Fire and Materials (IWGFM)

Sessions on Fire Safe Materials and IWGFM Business Meeting

National Center for Advanced Manufacturing–Louisiana Partnership

Session on Advanced Composites Manufacturing Technology

American Ceramic Society

Endorsing and promoting our conference to their members

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THE INTERAGENCY WORKING GROUP ON FIRE AND MATERIALS (IWGFM)

In 1993 Federal scientists and engineers from over twenty agencies formed a

new Interagency Working Group on Fire and Materials. The mission of the Group is:

To implement a coordinated, long-range national research effort to understand the fire thermal behavior of materials and develop advanced materials with improved performance. The agencies participating in the Working Group have mutual interest in fire and materials and will support cooperative research through the sharing of information and resources with the ultimate goal of improving human survivability and protecting property in severe thermal environments.

Within this mission, the IWGFM has five technical thrust areas.

- Health and Environmental Response**
- Testing of Fire and Thermal Properties**
- Advanced Materials and Processing**
- Modeling of Fire and Thermal Response**
- Establishing Data Base for Materials Fire and Thermal Properties**

The IWGFM is sponsoring five technical sessions at SAMPE 2004. This is the 11th anniversary of the SAMPE and IWGFM co-location. In addition, it will hold its 17th general meeting on the afternoon of Wednesday, May 19 at the conclusion of the Fire Performance session. This general meeting will be monitored by Mr. Usman Sorathia.

This meeting is open to all federal employees and private sector personnel with interest in fire safety and materials. If you have any questions or need more information, contact: Usman Sorathia at 301/227-5588.

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7th ANNUAL SUPER LIGHT WEIGHT COMPOSITE BRIDGE BUILDING CONTEST

ONCE AGAIN, Bridge Building As You've Never Seen It

Join the fun!

Rules

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SYMPOSIUM COMMITTEE

SAMPE 2004 is sponsored by the SAMPE Utah Chapter

General Co-Chairmen	John E. Green, <i>The Green Sales Guy, Inc.</i> Steve R. Rodgers, <i>EDO Fiber Science</i>
Program Co-Chairmen	Prof. Daniel Adams, <i>University of Utah</i> Richard K. Dropek, <i>Composite Professionals, Inc.</i>
Tutorials Chairman	Daniel K. Buckmiller, <i>Advanced Composites, Inc.</i>
Audio/Visuals Chairman	Blake W. Juhl, <i>Rohm GmbH & Co. KG</i>
Volunteers Chairman	Prof. Valeria La Saponara, <i>University of Utah</i>
Finance Chairman	Prof. A. Brent Strong, <i>Brigham Young University</i>

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QUESTIONS ?

Call SAMPE at 800/562-7360, or Fax 626/332-8929, or

sampeibo@sampe.org

Exhibits: Rosemary Loggia, ext. 601, or exhibits@sampe.org

Registration: Priscilla Heredia, ext. 610, or registration@sampe.org

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